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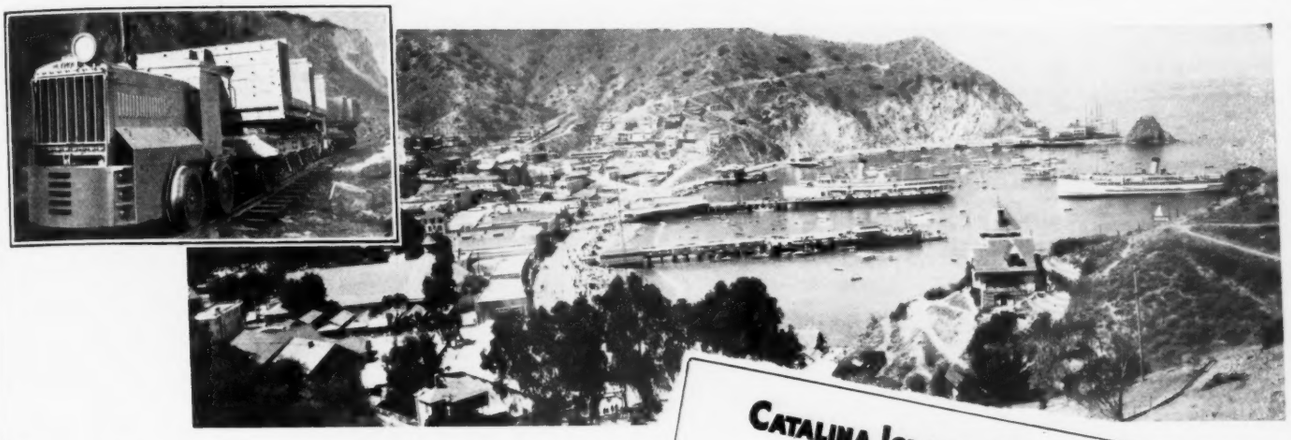
Chicago, April 4, 1925 (Issued Every Other Week) Volume XXVIII, No. 7



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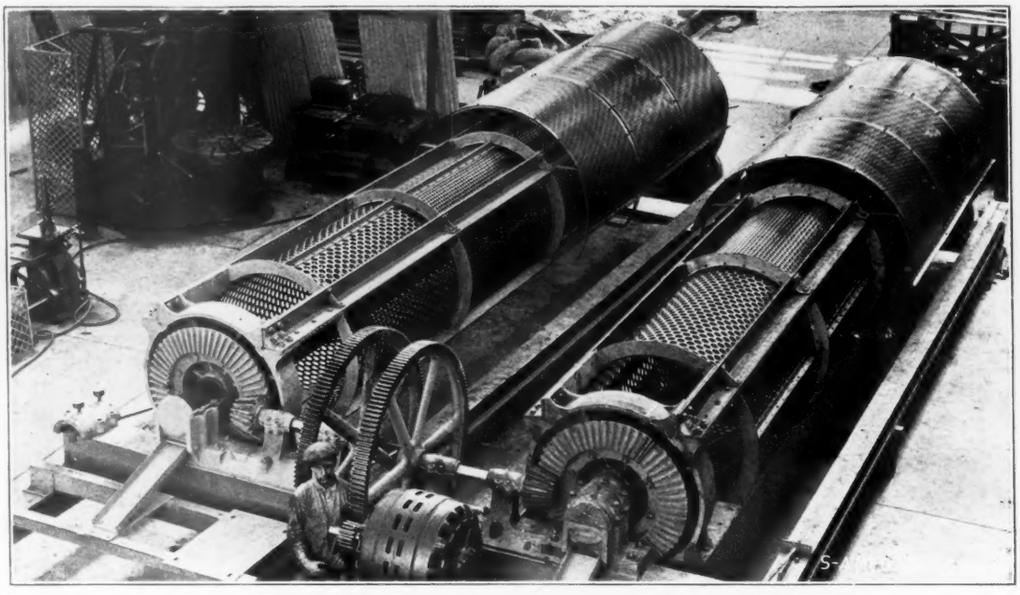
We can recommend Plymouth locomotives to any one in need of an engine that will hit the ball day in and day out, with the roughest kind of work to contend with.

DMR-M

Very truly yours,
D M Renton
Vice-President & General Manager

THE FATE-ROOT-HEATH CO.
Plymouth Locomotive Works
PLYMOUTH, OHIO

PLYMOUTH
Gasoline Locomotives



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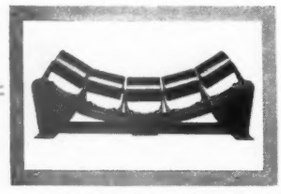

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Rock Products
CEMENT and ENGINEERING NEWS

Volume XXVIII | Chicago, April 4, 1925 | Number 7

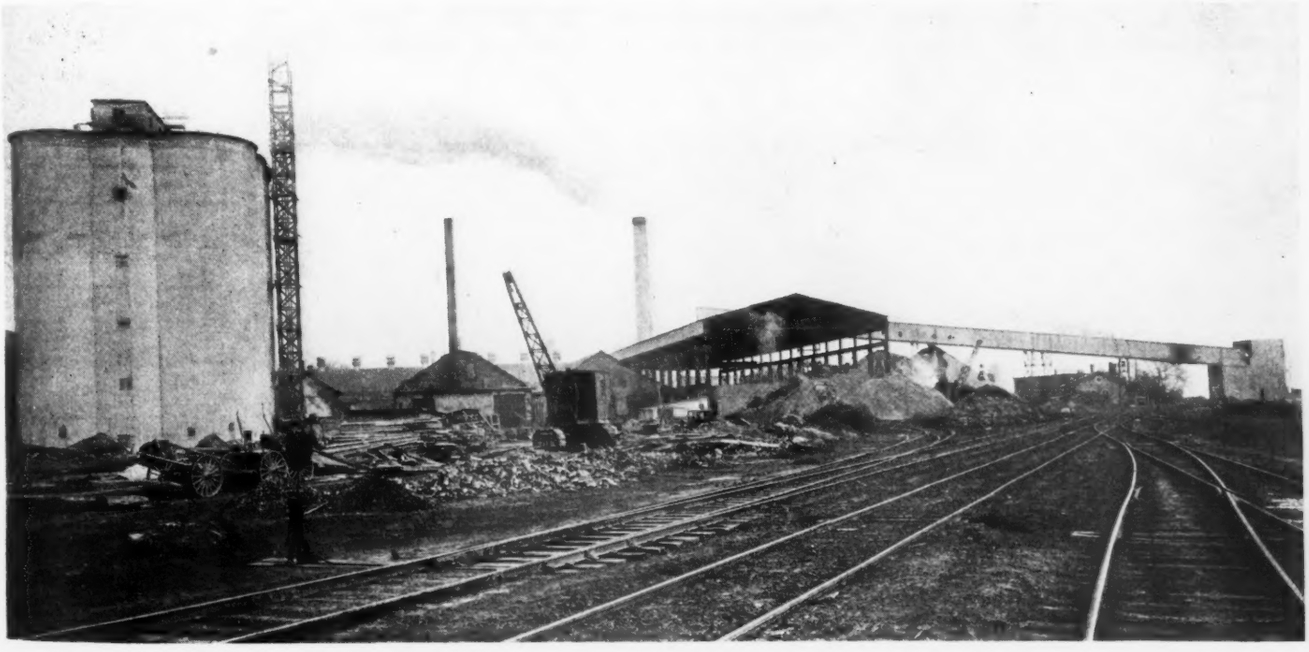
Pumping Finished Cement

New Egyptian Portland Cement Company's Plant at Port Huron, Mich., Pumps All Bulk Material by Pneumo-Electric System—Notable Features Are Absence of Dust and of All Elevators and Conveyors

By Charles A. Breskin

IN 1922 the Grand Trunk Railway system offered for sale the old Fort Gratiot Shops at Port Huron, Michigan, the site being adjacent to the St. Clair river and having good dock facilities. The New Egyptian Portland Cement Co. with one plant at Fenton, Michigan, purchased the property which consisted of several buildings, although in effect, one long building with three branches, forming the letter "E," and all inter-connected.

To install a cement plant in these shops it was necessary to use every inch of available space and the problem was solved only after careful planning on the part of John A. Acker, consulting engineer and assistant general manager of the New Egyptian Portland Cement Co. It is obvious that with very limited space the use of elevators and conveyors of all kinds had to be kept down to a minimum and in this instance a system was developed for conveying finished cement requiring no elevators or conveyors what-



General view of the plant of the new Egyptian Portland Cement Co., Port Huron, Mich., showing new silos under construction

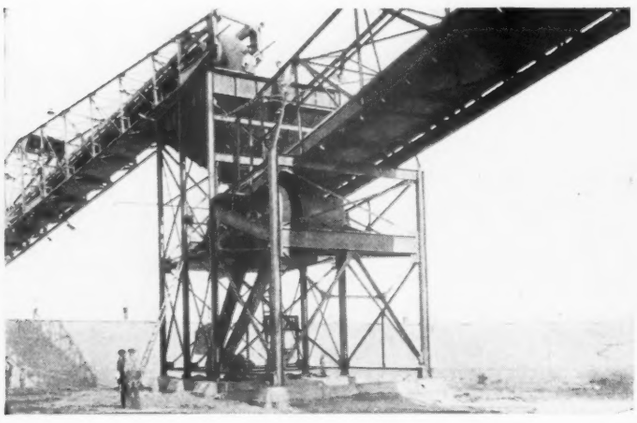
Belt-conveyor unloader on boat feeding hopper and conveyor belt to plant

ever. The system developed is essentially the same as the Fuller-Kinyon system previously used for conveying powdered coal with which cement mill operators are familiar. It has proved to be very economical, due to the horsepower saved that would otherwise be required for elevators and conveyors. Another consideration is that it is practically dustless in operation and on the whole makes a very flexible unit. A detailed description of this unit follows elsewhere in this article.

In laying out the cement plant the northern building, about 250 ft. long, was made into a kiln room, and opening out of this room from north to south are the raw grinding department, the machine shops, sacking department, with stockhouse in the rear and the finish grinding room with coal preparation in the rear. In this way all available space was used and the buildings left substantially as they were.

Handling Raw Materials

Limestone is received from Rogers City, Mich., in 10,000 ton boat loads. The stone received is quarry screenings, ¾-in. and under, requiring no preliminary crushing. The boats are provided with a swinging belt conveyor of sufficient capacity to unload a 10,000 ton cargo in 6 hours. The stone is spouted into a receiving hopper on shore at the rate of 1666 tons per hour, and from here a 54-in. belt conveyor 319 ft. centers, delivers the stone to the storage house. The conveyor is driven by a 150-h.p. Westinghouse motor and has a variable speed of from 450 to 600 ft. per minute.



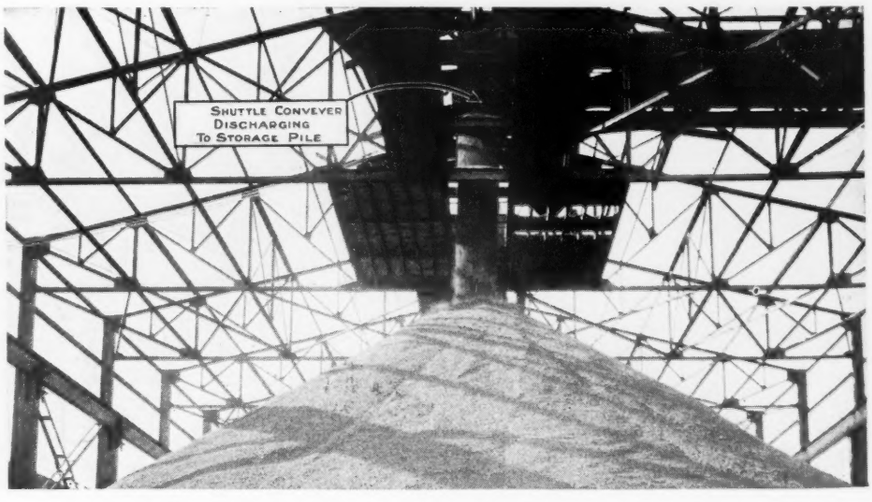
Receiving hopper of plant conveyor and discharge end of boat conveyor

Conveyor belt gallery of main belt on an incline of 11 deg.—Looking down from the plant toward the receiving hopper shown to the left

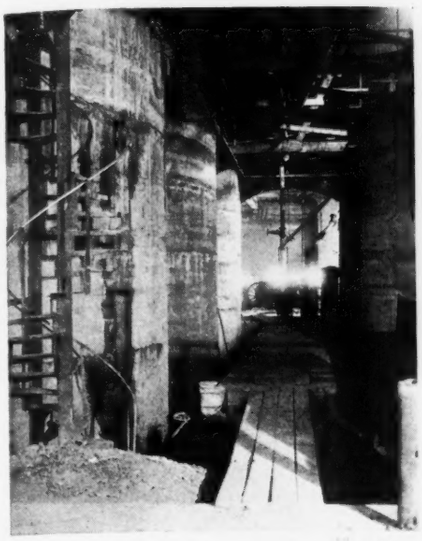
The belt conveyor gallery is of the overhead truss type, designed to give the conveyor an incline of 11 degrees. In order to reduce vibration the conveyor is driven from the tail end, making it possible to locate the driving mechanism close to the ground, and entirely apart from the steel structure. Another important feature is that the conveyor carriers are spaced 3½ ft. apart, and are mounted on ball bearings.

The main conveyor delivers the stone to a cross shuttle conveyor located in the rock storage building, which is 300 ft. long, 80 ft. wide and 33 ft. from floor to top of the rail, with axis transverse to the main conveyor. This space is straddled by a steel structure, at the midpoint of which the head end of the main conveyor rests. In order to get distribution along the entire length of the building, the 54-in., 150 ft. centers, shuttle conveyor was installed. It is carried on a steel track and is equipped with a reversible drive, making it possible to discharge at any point in either end of the building. Over 72,000 tons of rock and 15,000 tons of clay can be stored in the building, which is more than ample to carry the plant over the winter months, when navigation on the lakes is closed. This conveyor system was installed by the Stephens-Adamson Manufacturing Co.

Clay is brought in from the company's



Shuttle conveyor discharging to storage pile; view taken before housing of stone storage was completed

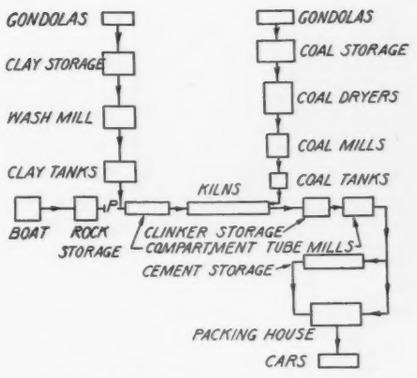


Six reinforced-concrete slurry tanks

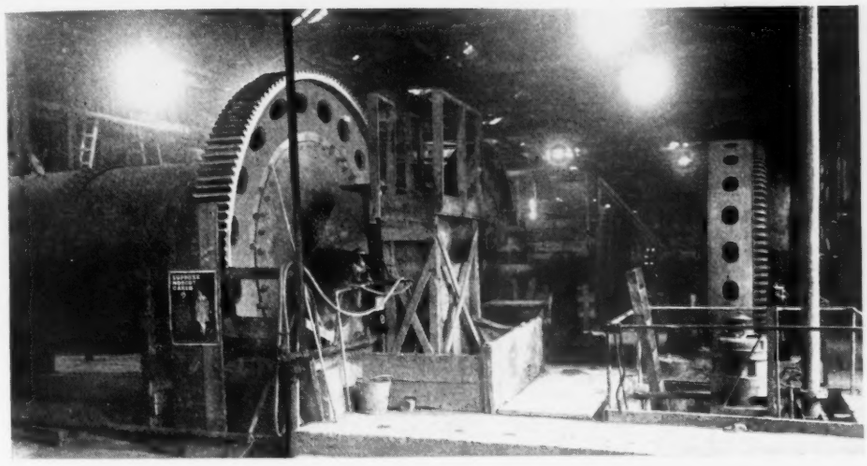
pit at Corona, Mich., about 100 miles from Port Huron, by rail in standard equipment. This pit was developed for the Fenton plant and inasmuch as the original layout had capacity enough to supply both plants, it was not necessary to develop anything new for the Port Huron plant.

A 7-ton Milwaukee overhead electric traveling crane equipped with a clamshell bucket runs the entire length of the storage building. It is used to unload the clay, distribute in storage and to feed the clay to a wash mill; it also takes stone out of storage and deposits into a hopper feeding the raw grinding tube mills. Only one man is required to operate the crane each shift, and he takes care of the wash mill and tube mill requirements.

Clay is ground in a 20-ft. F. L. Smidth wash mill until it has reached a consistency of about 60% water and it is then pumped to the clay storage tanks by a 4-in. Morris centrifugal pump, direct-connected to a 25-h.p. vertical Westinghouse motor. The pump was specially designed to Mr. Acker's specifications and is standardized throughout the plant wherever slurry has to be conveyed. The wash mill is driven by a 50-h.p. variable speed Westinghouse motor through a Link-Belt silent chain drive.



Flow sheet of new Egyptian mill



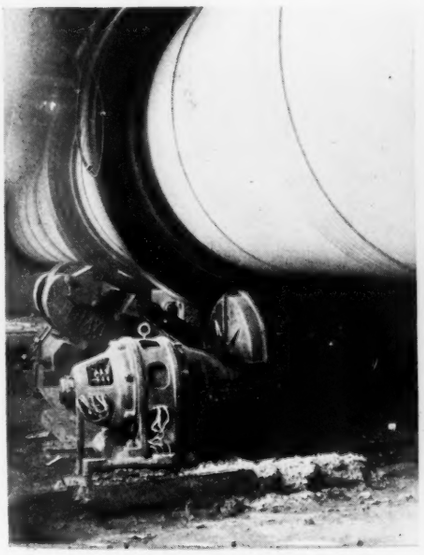
Raw-grinding compartment tube mills driven by 500-h.p. synchronous motors

The clay tanks are 20x21 ft. and are provided with mechanical agitators. Clay is taken out of here by a 4-in. centrifugal pump and delivered to the head of the compartment mill, where a ferris wheel feeder takes out just enough for proper mixture with the rock, while the remainder flows back to the pump sump.

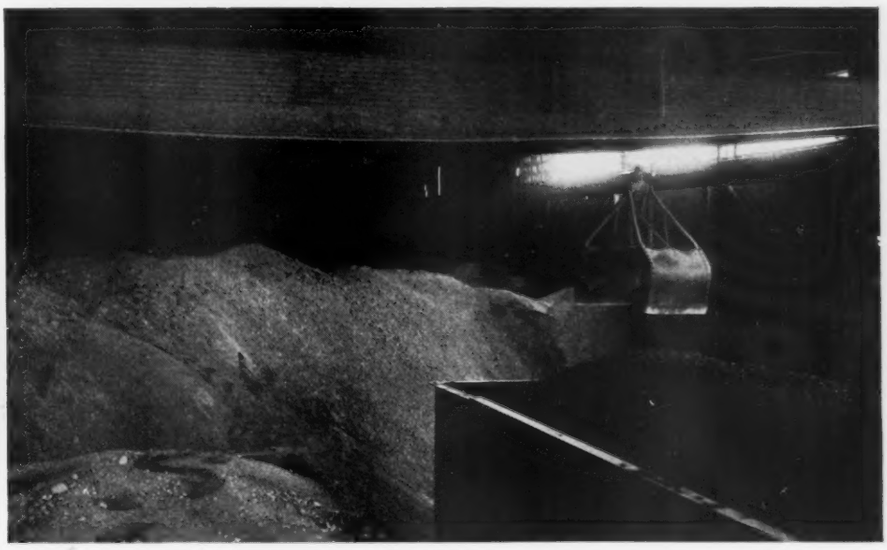
Limestone from the warehouse is deposited into hoppers, from which it is drawn out by Schaffer poidometers and fed directly to the compartment tube mills.

Grinding and Burning

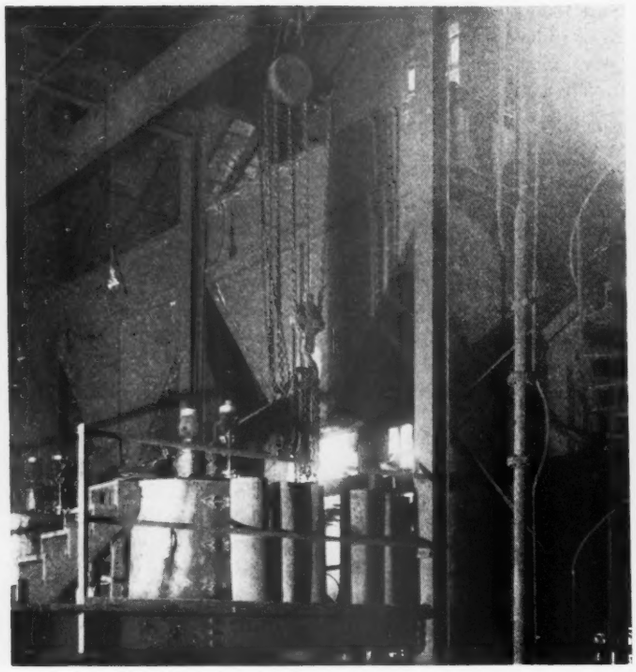
The raw grinding department consists of two 7x26-ft. Traylor 3-compartment tube mills driven by 500-h.p. synchronous motors through 60-in. Cutler-Hammer magnetic clutches. The first compartment of the mill is loaded with 4-in balls, the second, 2½-in. and the last or final com-



The 100-h.p. motor driving kiln 11x200 ft. through a silent chain drive



Traveling crane in clinker storage building, also handles all gypsum and coal



Coal-grinding department

Pumping finished cement

partment with 1¼-in. balls. The discharge from the mills goes to a common sump, where a 4-in. pump delivers the slurry to six 20x21-ft. slurry tanks. Here, if necessary, proper correction can be made, facilities having been provided so that slurry can be pumped from one tank to the other.

Slurry from the tanks is pumped directly to a Traylor rotary kiln 11x200 ft., driven by a 100-h.p. Westinghouse variable speed motor. The kiln is supported on two bearings and is lined for the first 160 ft. with fire brick, the remainder being left bare.

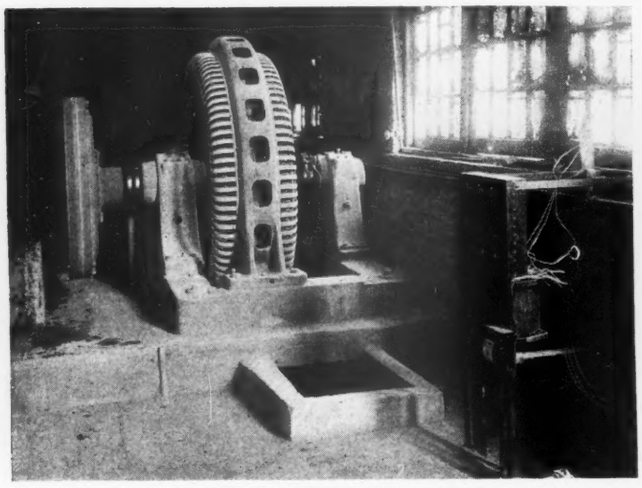
Clinker is discharged from the kiln into a pit where it is picked up by a chain elevator and discharged to clinker storage.

The average capacity of the kiln during 1924 was 1685 bbl. per day. This high capacity is claimed to be primarily due to the Acker-Cheesman patented combustion system that is in use at this plant. The system is a joint patent of Mr. Acker and Mr. Cheesman, consulting chemist for the company, and, it has been said to increase the capacity of the kiln 40%. The system is built up on scientific combustion principles, where a definite velocity of air and a perfect draft have been determined.

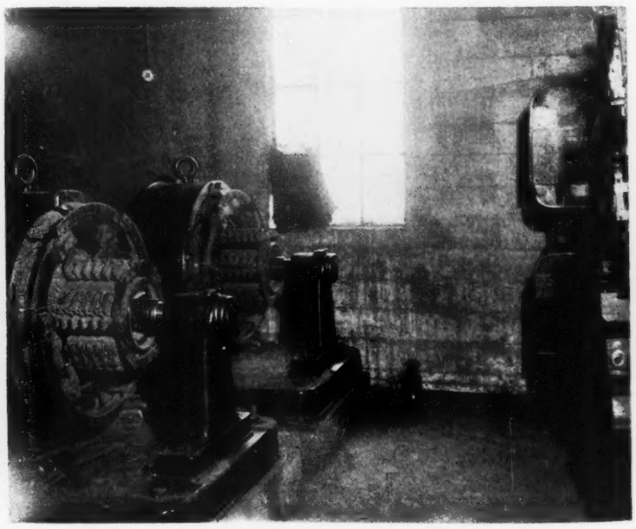
The clinker storage is an exact duplicate of the rock storage. A 7-ton Milwaukee overhead electric traveling crane is used to distribute clinker in storage and also to feed compartment tube mill hoppers. It handles coal and gypsum in a similar manner. The building stores 75,000 bbl. of clinker, 5000 tons of coal and 2000 tons of gypsum. Receiving hoppers for coal, gypsum and clinker are all in one line, thus eliminating any elevating or conveying machinery.

Coal is dried in a 46-in. by 42 ft. Fuller-Lehigh direct-fired dryer, which has a sufficient capacity in 8 hours to operate the kiln 24 hours. In conjunction with the dryer is a cyclone dust collection system, which reclaims all the coal dust and puts it into the firebox of the dryer. This not only eliminates dust but furnishes fuel for operation of the dryer.

The discharge from the dryer is conveyed to two 46-in. Fuller-Lehigh pulverizers where the coal is ground fine enough for kiln feed. The pulverizers discharge to a 6-in. Type "C" Fuller-Kinyon pump



One of the 500-h.p. synchronous motors on tube mills which are operated on 4600 v.



Direct-current generators and control board

which conveys the pulverized coal through a 4-in. pipe line to bins ahead of the kilns.

The finish grinding department is an exact counterpart of the raw grinding. The discharge from the tube mills is taken by a screw conveyor and elevator and deposited in a bin of 200 bbl. capacity immediately overhead by two 6-in. Fuller-Kinyon pumps. The pumps deliver to either stock house or packing bins. The arrangement is a very flexible one and does away entirely with all elevators and conveyors. The stock house has a capacity of 26,000 bbl. Cement is drawn out by screw conveyors and delivered to another Fuller-Kinyon pump which carries it to the packing house.

At the present writing the company is installing another 11x200 ft. kiln and two 7x26 ft. three-compartment tube mills. A new silo warehouse with capacity for 80,000 bbl. of finished cement is in process of completion as will be noted in one of the accompanying photographs. It is being built by the MacDonald Engineering Co. This new storage consists of four silos 32x80 ft. Within the next few months a new packing house will be built, to accommodate a battery of four 5-tube Bates packers.

Underneath each row of the new silos will be traveling Fuller-Kinyon pumps so that it will be possible to draw cement out of any silo and convey direct to the new or old packing plant. The Fuller-Kinyon pumps delivering finished cement from the tube mills will be changed so that cement can be sent to either new or old stock house.

All of the new machinery is being installed and all construction is carried on without interfering with the operation of the existing units.

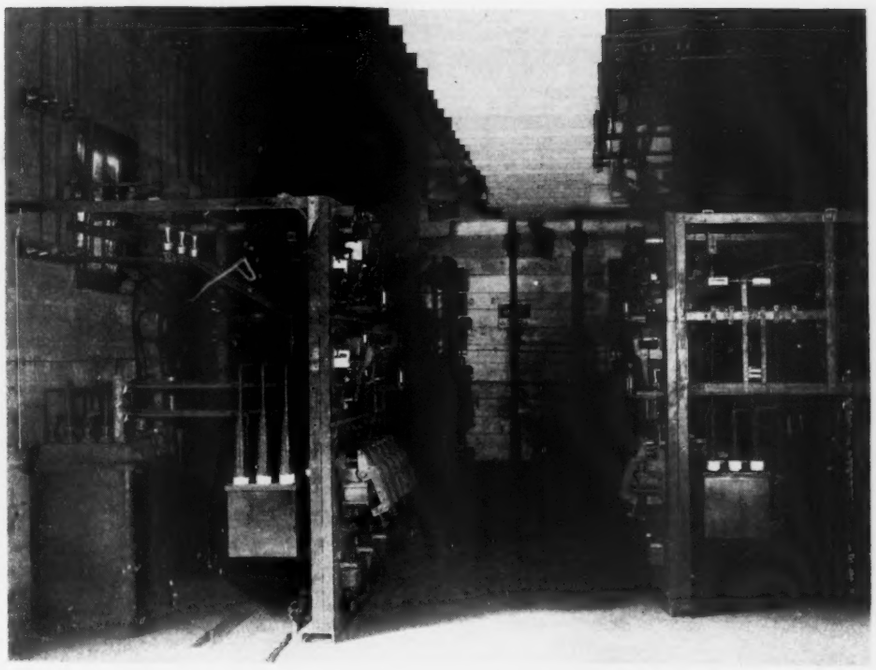
Of special interest in this plant is the high capacity obtained from both raw and finished grinding tube mills. The writer was given the opportunity to check over actual production figures for the month of June, 1924—an average month—and found that during 30 days of operation the wet mill showed an average of 85.3 bbl. per hour, while the finish mill showed 85 bbl. per hour. This coupled with the exceptional capacity of the kiln, 1685 bbl. per day, gives the plant an exceptionally high capacity rating.

Direct-drive on clay mill

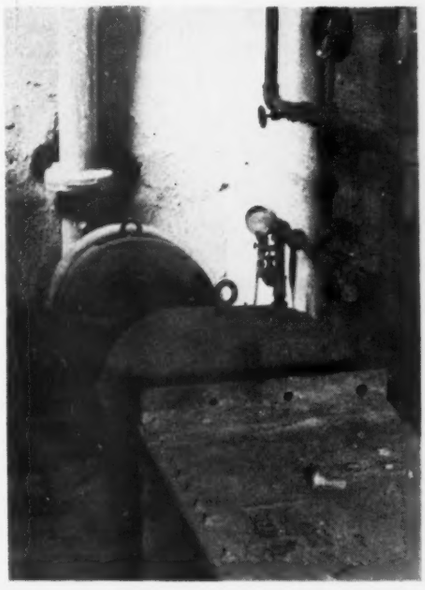
Another point of interest is the fact that this is a dustless mill, no dust being noticed in any of the various departments.

About 2800 deg. F. of heat is developed in the kiln, but actual calcination takes up much of this heat, allowing gases to pass from the kiln at about 700 deg. F. A stack 210 ft. high is located back of the kiln, but before gases are permitted to enter the stack, they are passed through a precipitation house, where they are washed, thus relieving them of dust. The escape from the stack is a white vapor.

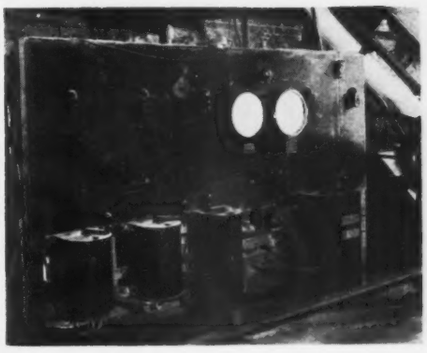
Water used in precipitating the gases is employed later in the wash mill. This water is heated to a relatively high temperature and carries much of the dust with it. The use of this water to wash the clay is particularly beneficial during the



Main-line switchboard room and synchronous-motor control

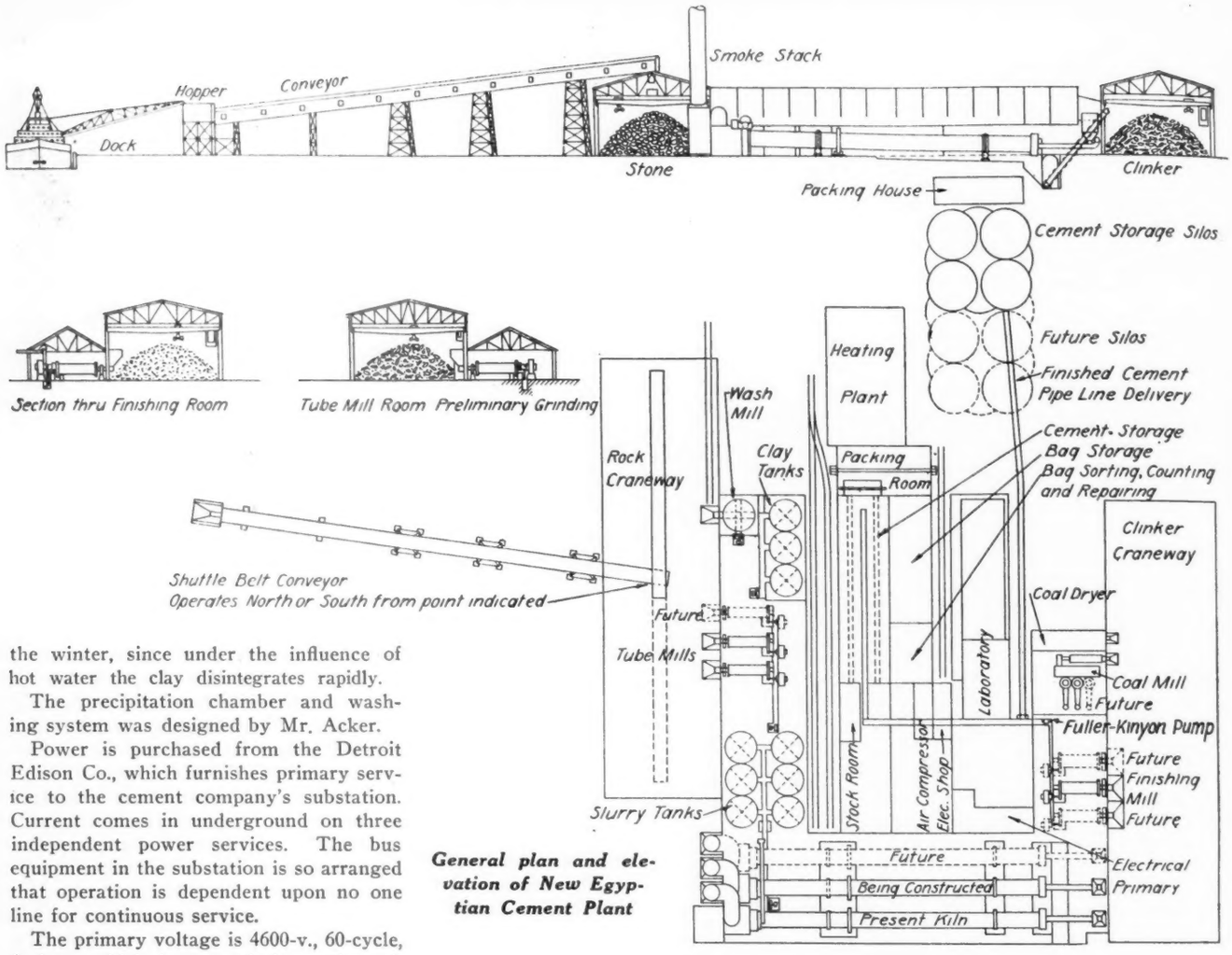


Pump on finished cement



Kiln-control switchboard

Packing house starting room



General plan and elevation of New Egyptian Cement Plant

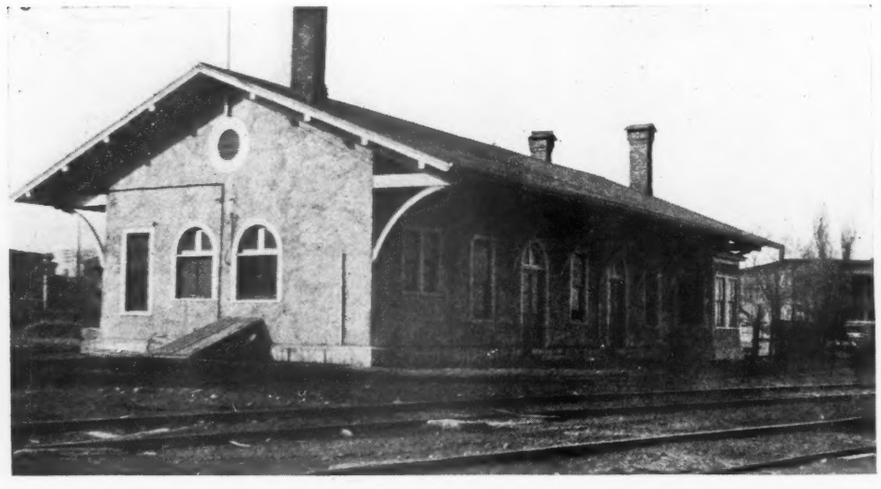
the winter, since under the influence of hot water the clay disintegrates rapidly.

The precipitation chamber and washing system was designed by Mr. Acker.

Power is purchased from the Detroit Edison Co., which furnishes primary service to the cement company's substation. Current comes in underground on three independent power services. The bus equipment in the substation is so arranged that operation is dependent upon no one line for continuous service.

The primary voltage is 4600-v., 60-cycle, 3-phase which is stepped down through three banks of three 200 k. va. Westinghouse transformers to 440 v. The transformers are located in three central points of distribution in the mill eliminating line drop and heavy feeder transmission.

The 500-h.p. synchronous motors are operated on 4600-v. and direct current for their operation is furnished by two 125-h.p. induction motor driven generator sets, generators being rated at 75 k.w. The entire electrical equipment is controlled by stop and start push button equipment located at various operating points. All equipment throughout the mill is operated by individual motors and wherever reduction of speed is necessary Palmer-Bee gear reducers are used. The induction motors used range from 3 to 150 h.p. with speeds of from 870 to 1160 r.p.m. Standardizing on motors eliminates additional cost of spare motors, besides giving inter-changeability from one service to another. All squirrel-cage motor equipment is controlled by Westinghouse remote controlled starters. As a safety precaution all starters for motors are arranged in individual starter rooms in each department. The total connected load in the plant is 3200 h.p.



Office of the new Egyptian Portland Cement Co. was formerly the passenger station of the Grand Trunk Ry. where Thos. A. Edison learned telegraphy

Organization

The laboratory was once the Guard House of old Fort Gratiot and is probably rich in history.

Officers of the company are:

M. D. Smith, president and general manager; E. R. Sullivan, vice president and sales manager; C. A. Bray, secretary and treasurer; J. A. Acker, consulting engineer and assistant general manager; R. D. Cheesman, consulting chemist; A. A. Desterle, superintendent; J. W. Bateman, chief chemist; E. F. Rowe, chief electrician.

The DeVal Test for Crushed Stone

Woefully Out of Date in View of Present Requirements of Road Metal

By Tyrrell B. Shertzer
Engineer-Manager, Ohio Dolomite Association, Columbus, Ohio

FOR some time past, there has been a growing feeling among engineers that the DeVal test is not one which should be given as much weight, in judging the suitability of rock for use in modern highway construction, as was formerly accorded it.

The test was developed as a laboratory adaptation of the conditions existing in water-bound macadam roads built of hand broken stone, caused by the use of roads by horse-drawn, steel-tired traffic.

The test is a combination of abrasive and impact forces. The abrasive action is supposed to measure the value of the stone to resist the internal and surface grinding action on the stones due to the passage of vehicles. The impact action is supposed to measure the value of the stone to resist the blows of the horse shoes and steel tires.

It is difficult to understand just why, or how, this test was ever adopted as a criterion to judge the suitability of stone for use in concrete or bituminous types of roads. In these types of construction the stones are held in place by binders and are separated from each other by the matrix, thus eliminating internal wear. It is still more difficult to see any justification for the use of this test as a criterion to judge the suitability of stone for use in a modern highway.

Modern traffic is motor-driven and rubber-tired. The impact of horse shoes and steel tires is a thing of the past. Such blows as are delivered to the pavements, due to wheels running over obstructions, are cushioned by the rubber tires.

To resist the displacing action of the driving wheels, modern highways must of necessity be thoroughly compacted during construction and all interstices completely filled. Modern water-bound macadam roads are given a surface treatment to provide a smooth riding surface and to prevent the displacement of surface stones.

The DeVal test has been applied to rock as a criterion of its suitability for road building, without giving consideration to the origin, nature, structure or properties of the rock. This procedure would appear to be about as logical as judging the suitability of lumber for house-building by measuring the resistance offered by the wood to a standardized saw actuated by a standardized force.

An Analysis of the DeVal Test

As has been previously stated, the DeVal test is a combination of abrasion and impact.

The degree to which a piece of rock will wear away, by abrasion, is a function of its surface area. The degree to which it will be affected by impact is a function of its weight, or mass, when the impact is due to the pieces of rock striking against each other, as in the DeVal test. It is self evident that the resistance of a rock to the abrasive or (and) impact forces will depend upon the size, shape, nature and structure of the pieces of rock being tested.

It is also self evident that some rocks will offer more resistance to abrasion than to impact and vice versa, due to their structure and composition.

Let us assume a cubical piece of material having a side of unity. The mass or volume of such a cube is unity and the surface is six square units, therefore the surface-mass ratio is six (surface divided by volume). The surface-mass ratio for a sphere having a diameter of one is also six. Now divide this cube, having a side of unity, into cubes each having a side of one-half the original cube. The volume of each of the smaller cubes is one-eighth that of the original while the surface of each of the smaller pieces is one-fourth the surface area of the original cube, thus we have a surface-mass ratio of 12. The same surface-mass ratio holds for a sphere of one-half the original diameter.

From this we see that as we *decrease* the size of a piece of stone we *increase* the ratio of surface to mass and vice versa.

When rock is subjected to the DeVal test we will have one of three conditions existing, depending upon the size, shape and nature of the pieces. For certain surface-mass ratios the abrasive action will undoubtedly be the greater, for other ratios the abrasive and impact forces will be about the same, and for still other ratios the impact forces will predominate. Thus we see that the total "wear" of the rock will be in inverse proportion to the surface-mass ratio, provided the same *number* of pieces of stone are used in the several tests.

The United States Bureau of Public Roads has recently published the results obtained by subjecting different sized pieces of rock to the DeVal test.* When analyzed, these results are about the most severe arraignment of this test, and its general application to all rocks, which has ever been published.

Let us first plot the points given to a larger scale and connect the given points by straight lines to indicate the characteristics. Let us also plot the surface-mass ratio curve to the same scale. This curve, while not strictly correct owing to the irregularities in the shapes of the pieces of rock, will be sufficiently accurate for the present purpose.

In this series of tests, commercial stone was separated on standard round hole screens by ¼-in. steps. Fifty pieces of each size were then selected for the test.

An examination of Figs. 1 and 2 leads to several interesting deductions.

First, it will be noted that the total wear is inversely proportional to the Surface-Mass Ratio.

Second, it will be noted that there are decided changes in the slopes of the connecting lines lying at, or between, Surface-Mass Ratios from about 4.4 to 5.3.

Third, will be noted the increasing effect of impact as the pieces become larger in size.

Fourth, it will be noted that there appears to be decided and distinct characteristics due to the differences in the nature of the rocks tested.

These graphs would seem to indicate that with the exception of the Esserville rock, there is a decided point of transition from abrasion to abrasion plus impact effect which occurs when the surface-mass ratio is about 4.5.

Let us now replot the points for the purpose of determining general influence lines in order to study the characteristics of the several rocks when subjected to this test. We will analyze the points for each of the rocks separately at first.

For each of the rocks, it is suggested that the sheet on which the points appear be held making a slight angle with the line of vision so as to bring out the general trend of the points.

For the "Stone City" rock we find that the general trend of the points is in the direction of a curve which is convex upward, as indicated by the dotted curved line. This would appear to indicate that the rock is more resistant to impact than to abrasion since the slope of the curve decreases as the effects of impact (due to size or mass of the pieces) increase.

The trend of the "Kettle River" rock is, in general, similar to that of the "Stone City" rock. In this case, however, we find that four of the five points will fall on a smooth curve. We also find that the rela-

*"Public Roads," Vol. 5, No. 9, November, 1924, page 15.

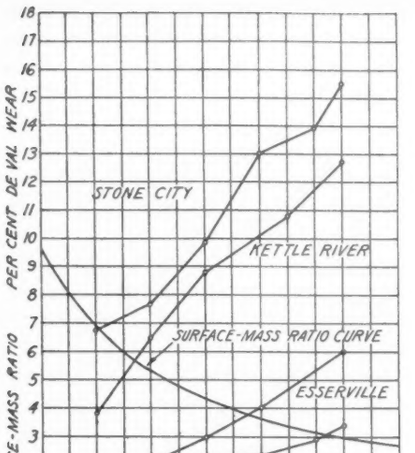


Fig. 1

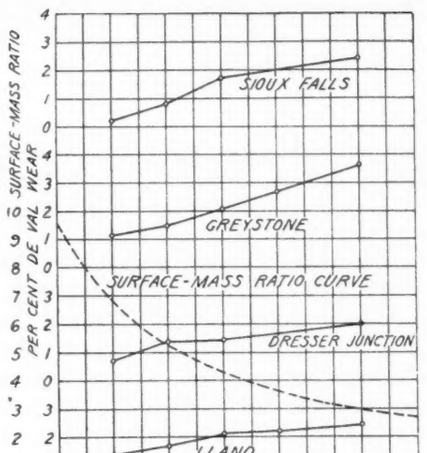


Fig. 2

tive resistances of the rock to abrasion and impact are much more pronounced than in the "Stone City" rock and that the resistance of the rock to impact is much greater.

For the "Esserville" rock we find that all of the points fall on a smooth curve which is concave upward, showing that the rock is more resistant to abrasion than to impact. For the "Columbia" rock we find that three of the five points fall on a smooth curve with the remaining points so close to the curve as to indicate laboratory errors. This curve indicates that the rock is more resistant to abrasion and less resistant to impact.

In the case of the "Sioux Falls" rock three of the four points fall on a smooth curve which is convex upwards, indicating greater resistance to impact than to abrasion.

All five of the points for the "Graystone" rock fall on or are tangent to a smooth curve which is concave upward, indicating greater resistance to abrasion than to impact. For both the "Dresser Junction" and "Llano" rocks all of the points fall very close to smooth curves which are convex upward and both indicate greater resistance to impact than to abrasion.

The short report gives no data as to the nature of the rocks but a careful study of the curves clearly indicates decided differences in their structures and natures.

It will be observed that the "Dresser Junction" and "Llano" curves are quite similar and indicate that the rocks belong to the same family. Taking into consideration both the shape of the curve and the small amount of total "wear" the rocks would appear to be of a hard, tough nature such as trap.

The "Graystone" and "Columbia" curves are similar enough to indicate that these rocks were also of the same family, which might be granite, judging from the curve.

The "Stone City" and "Kettle River" curves, while somewhat similar, do not indicate a family relationship quite as strongly as do the other couples.

The "Sioux Falls" and "Esserville" curves would appear to indicate that these rocks were different from each other and from the rest.

In preparing a specimen for the DeVal test, the rock is broken into pieces as nearly cubical as possible and measuring as nearly two inches on a side as possible. Unless the rock is sawed into cubes, it is evident that it is not possible to prevent variations in size. It might be argued that this variation in size will balance itself in the several pieces so that there will be about as many below 2-in. as above. On the other hand, it is perfectly logical to assume that the majority of the pieces may have a majority of their measurements either above or below 2 in.

Let us see what differences in total "wear" results and relative effects for variations above or below 2 in. might be expected when the pieces range from 1¾ in. to 2¼ in. on a side, neglecting consideration of influences exerted by feather edges, etc. While no data are given for pieces greater than 2 in. it is fair and logical to extend the curves to the 2¼ in. sizes for the purposes of this study.

The following table shows the data picked from the curves on Graphs 3 and 4.

This table clearly shows the influence exerted by relatively small variations in size on the total "wear" of rock as determined by the DeVal test, particularly on rocks falling in the intermediate "Hard-Soft" class. It will be noted that the relative effects of size variations, in general, appear to reach a maximum in the hard-soft zone and then recede, which may be accounted for by the transition from maximum impact effect through balanced impact and abrasive to maximum abrasive effect.

It is unfortunate that no extensive tests, under field conditions, taking all factors into account have ever been made in the macadam and bituminous types of pavement. It is also

TABLE OF DATA PICKED FROM GRAPHS 3 AND 4

Rock	Total wear, per cent 1¾-in.	Total wear, per cent 2-in.	Total wear, per cent 2¼-in.	Per cent difference 1¾-2-in.	Per cent difference 2-2¼-in.	Rel. diff., per cent 1¾-2-in.	Rel. diff., per cent 2-2¼-in.
Stone C.	13.6	15.3	16.5	1.7	1.2	11.1	7.8
Kettle R.	11.6	12.7	13.3	1.1	0.6	8.7	4.7
Esserville	4.6	6.0	7.5	1.4	1.5	23.4	25.0
Columbia	2.6	3.4	4.3	0.8	0.9	23.5	26.4
Sioux F.	2.15	2.4	2.5	0.25	0.10	10.4	4.2
Graystone	2.9	3.6	4.2	0.7	0.6	19.4	16.8
Dress. J.	1.9	2.0	2.1	0.1	0.1	5.0	5.0
Llano	2.3	2.45	2.6	0.15	0.15	6.1	6.1

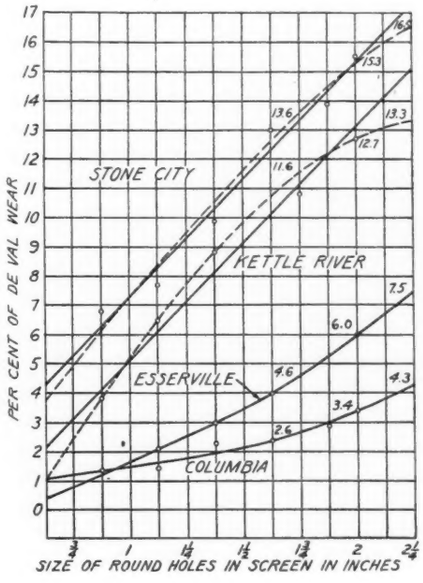


Fig. 3

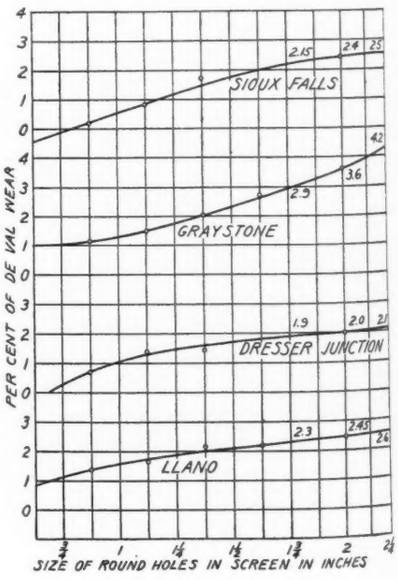


Fig. 4

unfortunate that there appears to be no reliable data available co-ordinating the physical properties of rocks, as developed by the usual laboratory tests, and actual service behavior and maintenance cost records.

Such tests have been made on concrete, brick and other hard surfaced, rigid types of pavements, indicating that impact is the most destructive force acting upon a modern highway.

It is difficult to see that there is much, if any, probability of internal wear in a properly constructed modern pavement of the surface treated or bituminous macadam types. Recent tests have fully proven that surface wear, under modern traffic, is a negligable factor. The general tendency, among present day highway engineers, is to use larger sized stone in the construction of their macadam and bituminous macadam roads. This tendency is probably due to a subconscious recognition of the facts so strongly brought out by the test data which form the basis of this discussion.

In any event the tendency to use larger stones has come about through experience and observation of service behavior under modern conditions.

In five of the eight curves it will be noted that as the pieces of rock become larger the relative wear, as determined by the DeVal test, becomes less and less. Few, if any, modern roads, other than those of the rigid slab types, are built of stone as small as 2 in.

While the data presented in the short report are not extensive enough to warrant the drawing of any definite conclusions, they are sufficient to justify grave doubts as to the value of the DeVal test as an absolute criterion by which to judge the suitability of rock for modern highway construction.

The main points upon which the data cast doubts are:

1. That this test is equally applicable to all kinds of rock.

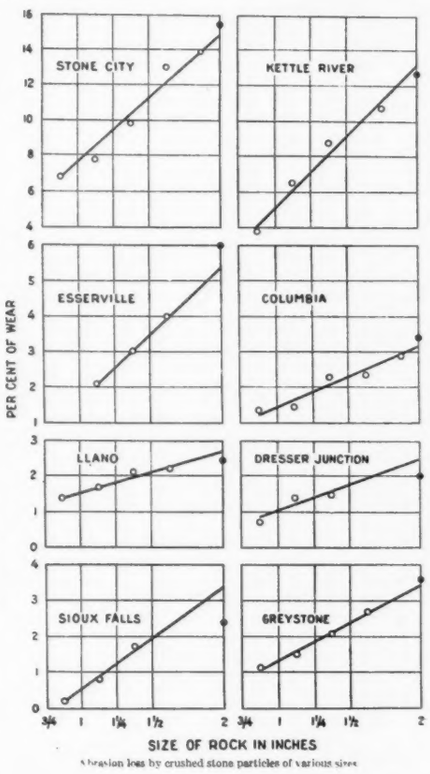
2. That engineers are justified in making this test on 2 in. pieces and then using the result to judge the suitability of the rock when used in pieces up to 5 in.

3. That the results of the test are real criterias when variations in average dimensions of as little as ½-in. may cause variations in results of over 2% absolute and as much as 50% relative.

Abrasion Test for Crushed Stone

THE Bureau of Public Roads wishes to call attention to a test for abrasion which may be applied to samples of crushed stone. As is well known, the present DeVal abrasion test is only adapted to the testing of rock samples where the individual fragments are at least 2 in. in diameter. No method has as yet been adopted for testing crushed stone in the smaller sizes such as ¾ in., 1 in. or 1½ in. The bureau has been endeavoring to develop a test of this nature for some time. Although the results so far secured are not sufficiently complete to warrant a recommendation for its general adoption it is believed that this method, which has so far given promising results, should be described for the benefit of others who may desire to work along the same line.

The method of test is as follows: The sample as received is separated by means of screens with round openings into as many of the following sizes as its gradation will permit: ¾ to 1 in., 1 to 1¼ in., 1¼ to 1½ in., 1½ to 2 in. Samples for test are then secured by selecting 50 pieces of each size, which are tested for abrasion separately in accordance with the usual procedure. When a sample of crushed stone is tested in this



Abrasion loss by crushed stone particles of various sizes

manner and the abrasion losses compared as in the accompanying chart, an interesting relation is observed, which may be stated as follows: For a given sample of crushed stone the loss by abrasion for each size tested is proportional to the size of the pieces composing the test charge, provided that the same number of pieces are used in each case. This relationship is, of course, only approximately true. There are many factors which tend to impair it, the most important of which are variations in shape of the fragments, slight variations in size, etc. For this reason it is well whenever making tests of this nature to secure at least duplicate results for each size.

Assuming, however, that the relationship is approximately true, this method of test presents a means of estimating the probable percentage of wear by the standard method in cases where it is impossible to make this determination directly. Referring to the accompanying graph, it will be noted that the straight line averaging the various points for each sample is extended to the right until it intersects the ordinate for the 2-in. size. The solid circles on the 2-in. ordinates in each chart represent the percentage of loss by the standard DeVal abrasion test. It will be observed that in only one of the eight cases plotted does the point where the straight line intersects the 2-inch ordinate differ more than 0.6% from the standard test result. This is true in spite of the fact that the standard test results were secured upon hand-broken samples, whereas the other values were obtained by testing the product of the crusher. The discrepancies that appear are caused without doubt by this difference in the character of the test pieces.—*Public Roads.*

H. F. Janda, Assistant Director, National Research Council

ANNOUNCEMENT is made by Chas. M. Upham, director of the highway research board of the National Research Council, of the appointment of H. F. Janda as assistant director. Mr. Janda is especially fitted for this position. He is a graduate of the University of Wisconsin, and for two years was assistant city engineer at Portage, Wis. Mr. Janda has not only had a variety of practical experience in engineering, but has also acted as instructor and assistant professor of civil engineering at the University of Cincinnati for five years. As associate professor of highway engineering at the University of North Carolina for three years he was in charge of experimental research in co-operation with the state highway commission. Mr. Janda has carried on many important research projects, including capillary moisture in highway subgrades, earth pressure tests on culvert pipe and other problems affecting highway construction.

Mr. Janda is located in the offices of the Highway Research Board in the Building of the National Academy of Sciences and National Research Council at B and 21st streets, Washington, D. C.

New Gypsum Plant Built at Phoenix, Ariz.

IN the southeastern part of Phoenix, Ariz., on the tracks of the Southern Pacific Ry., has been established the $100,000 gypsum plant of the new Phoenix Plaster Co. A deposit of alabaster gypsum, seven miles south of Winkleman, in the lower San Pedro valley, near Feldman, will be developed. The material will be crushed on the ground and transported by truck to Winkleman to be shipped to the plant at Phoenix.

The company will produce various gypsum products including building and casting plasters and gypsum fertilizer. The deposit is reported to contain millions of tons.—*Los Angeles (Calif.) Times.*

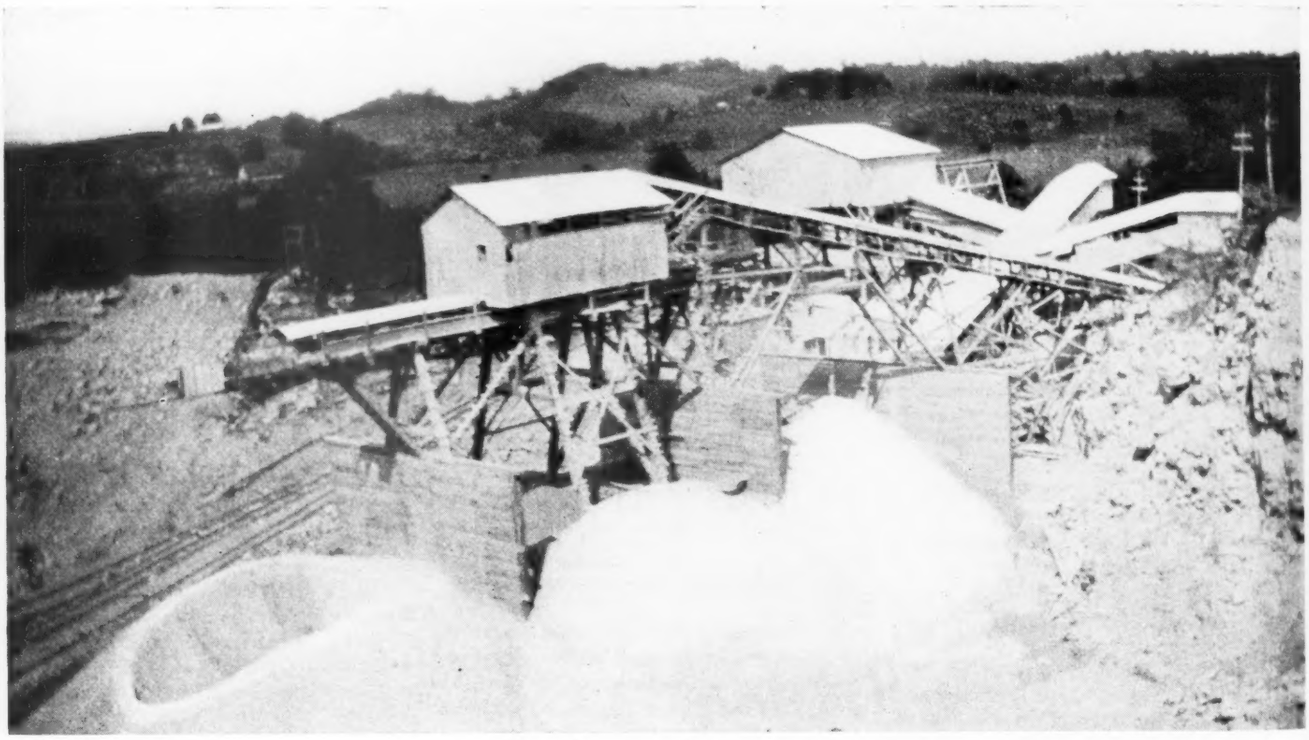
A Southern Quarry Operation

Quarry and Plant of the Holston Quarry Company at Strawberry Plains, Tenn.

By O. W. Hendrix

THE HOLSTON QUARRY CO. has three stone crushing plants with central office located in Knoxville, Tenn. The plant described below is located at Strawberry Plains, Tenn., 15 miles north of Knoxville, on the Southern railway.

This quarry has an average 75-ft. face and is approximately 700 ft. wide and 2100 ft. long. The deposit is of a high grade limestone which withstands a laboratory pressure test of 39,000 lb. to the sq. in.



General view of the crushing plant of Holston Quarry Co., at Strawberry Plains, Tenn.

Stripping operations are partly conducted with a revolving Erie shovel equipped with a ¾-yd. dipper with a manganese steel front. The muck is hauled away by means of two Fordson tractors with wheel scrapers and mule teams with drag scrapers. The overburden is from 2 to 6 ft. in depth. After getting as much as possible with the shovel and tractors, all pockets and seams are cleaned and cleared by a crew of pick and shovel men.

Blast hole drilling is done with a battery of three Keystone drills, two of which are electrically driven, and found to be much more economically operated than the steam machine. The holes are drilled 5⅝ inches in diameter with spacing of from 12x12 ft. to 20x20 ft., depending largely upon the depth of the holes and toes. Blasting is effective to the level of the quarry floor and is done by Cordeau-Bickford fuse and 4¼x10-in. and 4⅛x18 in. 60% dynamite. Secondary drilling is done by Ingersoll jackhamers, using ⅞-in. hexagon-hollow drill steel. These machines are driven by a 12x10-in. Ingersoll-Rand compressor.

Two railroad type Bucyrus shovels, Model 65, are in use for loading the stone into the 4-yd. dump cars. Each shovel is equipped with a 2½-yd. dipper with a manganese steel front. The shovels are of the same pattern and parts are interchangeable to prevent both being down at the same time for repairs.

For bringing the stone to the plant, 4-yd. side-dump Western cars are pulled by one 12-ton Porter locomotive and one 14-ton Vulcan locomotive. All trackage is of 60-lb. rail, 36-in. gage. Cars are hoisted up an incline 300 ft. in length by a Flory two-drum electric hoisting engine.

The primary crusher is a 30-inch McCulley Superior gyratory and the secondary crushers are one No. 5 Gates and one No. 27A Weston. The Weston is a new model with direct electric drive from the top of the machine. One No. 8 McCulley is reserved for use in case of breaking the large primary crusher. Over the crushers is a 10-ton Whiting traveling crane which extends from the crushers over the Southern railway switch track running parallel with the quarry.

From the primary crusher the 5-in. and smaller material is conveyed by an inclined 30-in. belt of 100-ft. centers to a revolving cylindrical McCulley screen which is 12 ft. long and 48 in. in diameter. Rejects from this screen are taken to the secondary crushers by a 24-in. inclined conveyor belt of 90 ft. centers. All material passing the first screen is conveyed by a 20-in. inclined belt f 100 ft. centers to another McCulley screen of same type as the first except that it is

Strawberry Plains quarry of the Holston Quarry Co.

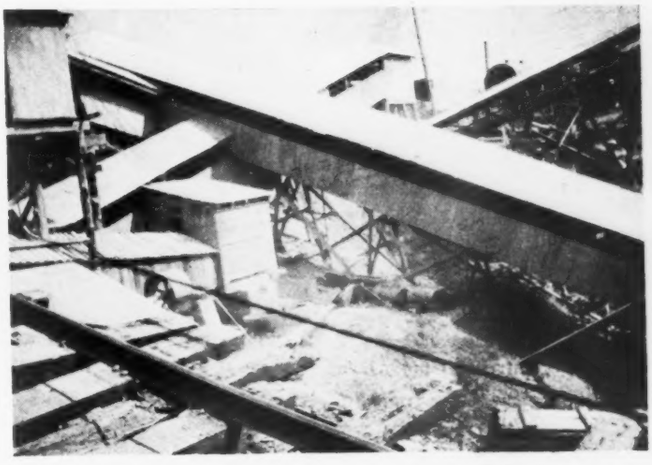
Another view of quarry-crushing plant at right

Fordson tractors and wheel scrapers for stripping

Three well drills used for blast drilling

Tractor steam shovel used for stripping

Crushing plant from top of quarry face



Conveyor galleries from quarry track incline

16 ft. in length. This screen with jacket separate the crushed stone into three different sizes: "two-inch," "one-inch," and screenings. Under this screen are two 20-in. conveyor belts which take the two-inch stone and screenings to their respective stock-

Overburden moved back ready for tractor

piles or storage bins. The one-inch stone falls directly into stock pile from screen.

This 16-ft. revolving screen is supported 60 ft. above the ground level by creosoted timbers and just under this screen are the stock piles which are over a concrete tunnel, which is 8 ft. high, 6 ft. wide and 160 ft. long. This tunnel houses a conveyor belt 24 in. in width and approximately 250 ft. centers. This belt carries the finished product from the stock piles to the railroad cars. There are 13 slide gates, each 12 in. in diameter, in the top of the concrete tunnel which permit the passage of the stone through the tunnel into small cars on a track above the belt. By means of these gates the product may be mixed in any manner desired. The "two inch" and "one inch" storage bins have a capacity of 6000 tons each and the screening storage a capacity of 3000 tons. Approximately one-half of this storage is dead if the cars are loaded by gravity.

All the plant is electrically driven by separate power units and all motors over 20 hp. use 2200 volt current which is transformed from Tennessee Electric Power Co.'s 66,000 volt line near the plant. The other power is transformed to required voltage at the plant.

Water that gathers in the quarry pit is pumped to a reservoir on a nearby hill by Cameron centrifugal pumps and is used to supply the dinkey locomotives and steam shovels.

The machine shop takes care of the usual quarry repairs and extra parts for shovels, crushers, etc., are carried in stock in a warehouse.

There are sufficient dwellings to house one-third of the crew and a boarding house is maintained for the benefit of others. The company has a commissary and has recently completed a new schoolhouse for the benefit of the employees' children.

To Promote Manufacture of Hydraulic Limes in America

THE U. S. Bureau of Standards is interested in the possibility of producing in this country some of the hydraulic limes with special properties which have been used for centuries abroad, and are still in such demand for particular uses that much

Machine shop

is imported. A progress report from the Bureau of Standards describes experiments with American limestones as follows:

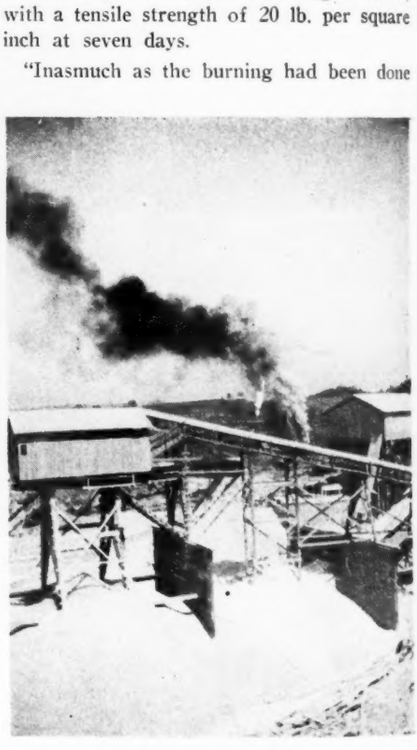
"Each year considerable quantities of hydraulic lime are imported into the United States. It is therefore obvious that if this material could be produced economically from domestic resources, which are available, it would result in a saving to the users and would open for development an industry which is not active at present. After the bureau had studied the literature on the subject it appeared entirely possible to produce such a material from the quality of limestone which is always present to a more or less extent in limestone workings, but which is not suitable for the production of good lime. There was very little definite information at hand, however, on the exact composition of stone necessary or the time and temperature of burning. The determination of these conditions has been made the subject of an investigation and some interesting results were obtained.

"Samples of limestone of the composition which seemed necessary for the production of hydraulic lime were obtained from several manufacturers of lime. Results obtained by other investigators indicated that a burning temperature in excess of 1350 deg. C. (2462 deg. F.) would be required However, when the stones were burned at this temperature and the products of calcination were hydrated, no hydraulic properties were exhibited, nor even setting properties in the air.

"The temperature of burning was then lowered to 1200 deg. C. (2192 deg. F.), and a product resulted which would set in from four to six hours in the air but had the undesirable property of dusting when dry. Slight hydraulic properties only were exhibited by this material.

"The burning temperature was still further reduced to 1120 deg. C. (2048 deg. F.), with a burning period of four hours, and a material was obtained which had some of the desired characteristics. It hydrated readily, and when made into a 1.3 mortar would set under water over night. Furthermore, the unexpected property of early strength when stored in air was exhibited, a set of from four to six hours as indicated by the Vicat needle being obtained, with a tensile strength of 20 lb. per square inch at seven days.

"Inasmuch as the burning had been done



Stock piles under sizing screens

in a small furnace a sufficient quantity of material for a complete determination of all of its properties was not obtained. It is, therefore, proposed to continue the work on a larger scale. Additional samples of limestone have been requested, and as soon as these are received and analyzed it is hoped to obtain the necessary information.

Limestone for Sheet Glass Making*

Paper Read at Annual Meeting of the American Ceramic Society by Edwin P. Arthur Contains Valuable Pointers for Limestone Quarry Operators

THE proper quality of lime and limestone for glass making has been the subject of some discussion,[2] but sufficient emphasis has perhaps not been placed on the requirements of a limestone for sheet glass and window glass manufacture. Sheet glass, including all glass drawn from the molten melt,[3] must be of the very highest quality to meet the present demands of the market.[4] With the exception of optical glass and some specialties it seems probable that drawn sheet glass requires higher quality raw materials and more careful process control than any other glass. This is true not only because of the large unit sizes of the ware[5] and the purposes for which sheet glass is used, but also because of the peculiar nature of the process of manufacture. The "drawing operation" very materially exaggerates the size of any seeds or stones in the glass and makes more conspicuous any slight defects in the body of the glass. Maintaining the color of a flint glass tank subject to heavy load requires a similar careful control of furnace conditions and temperatures.[6]

Of the raw materials used for sheet glass making, limestone is most subject to variation.[7] The alkali furnished to the trade is manufactured under strict technical control. The preparation of glass sand is a well-developed industry. Limestone, on the other hand, is largely supplied from stone quarries where the main production centers on furnace flux, building material or burned lime rather than a special product for the glass trade.

Disadvantages of Working High Quarry Faces

Limestone deposits are generally worked with high explosives from a vertical face into the quarry opening the depth of which is determined by the water level and the character of the deposit. Overburden is removed either by hand or with power scrapers. Frequently, if the overburden is very light, no attempt is made to remove it. A rough selection of stone is often made in quarries where quarry cars are loaded by hand, but selection is impractical where loading is done with power shovels. In some districts, the tendency has been in recent years to abandon open quarries and operate underground stone "mines." Mining avoids certain overburden troubles and permits a very flexible operation independent of weather conditions.[8] Resort has also been made to washing in an effort to eliminate contamination from overburden and mud seams as well as limestone dust.[9] A typical quarry operation is shown in Fig. 1.

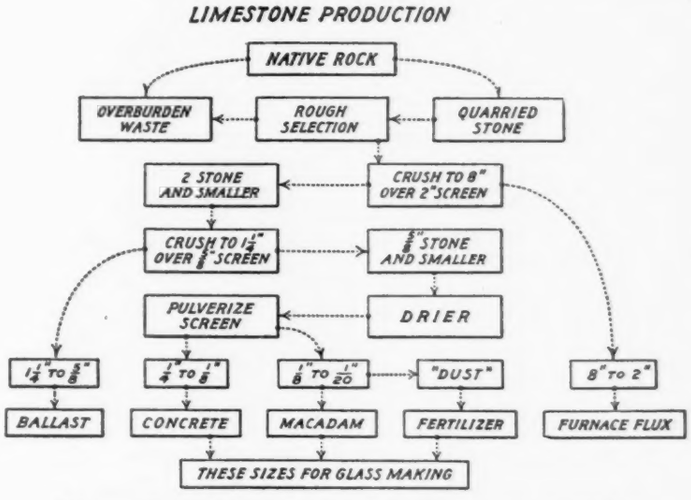


Fig. 1—Typical flow sheet of limestone quarry operation

The relative amounts of different sizes of stone produced depend somewhat on the character of the native rock. The preparation of the larger sizes always leaves some "fines" for which the quarryman is often glad to find a market. It is apparent from the diagram that any quarry debris from overburden or mud seams will pass through the milling with the fine ground stone. Subsequent screening of the pulverized stone will leave most of the dirt in the last separation. This fact offers a logical explanation to the belief of many glass makers that "fine ground limestone makes stones in glass." Fine ground limestone as a general rule, is more subject to contamination than are the larger sizes.

Advantage of Selected Stone

Just how serious quarry contamination may become is shown by the two tables of analyses of car-lot representative samples from a quarry in the Shenandoah district. Table I apparently indicates a uniform stone of fair quality. It is certain that this stone could not be condemned for glass making on the basis of the chemical analysis. In reality, however, this stone was uniformly contaminated with overburden debris. A very inferior glass was made from this limestone. An investigation of the quarry operation showed that the finished stone contained practically all the foreign matter loaded from the quarry.[10] A rigid selection system in the quarry made possible the production of a much better stones as reflected by the analyses in TableII. A very excellent quality of window glass was made from this material.

I—QUARRY RUN

Sample	SiO_2	R_2O_3	$CaCO_3$	$MgCO_3$
16217	2.13	0.48	95.37	1.46
16307	2.15	0.38	94.78	1.52
16311	2.24	1.01	94.62	1.65
16325	2.42	1.24	95.29	1.40
16506	2.69	1.66	95.06	0.98
16508	2.36	1.02	95.96	1.14

II—SELECTED STONE

Sample	SiO_2	R_2O_3	$CaCO_3$	$MgCO_3$
41219	0.66	0.70	97.44	1.08
41220	0.40	0.48	97.44	1.34
41221	0.52	0.52	97.46	1.22
41222	0.64	0.64	97.69	0.84
51224	0.82	0.56	97.13	1.02
41226	0.86	0.64	97.24	0.94

*Journal of the American Ceramic Society for March, 1925.

[2]Turner, English and others, *Jour. Soc. Glass Tech.* U. S. Bur. Stand., *Bull. 118*, "Tentative Specification of Limestone for Glass Making," Peddle, "Glass," 1, 148 (1924) and many others.

[3]The latest methods of making plate glass involve a drawing operation.

[4]"Master Specification of Glass for Glazing," U. S. Bur. Stand., *Circ.* 164.

[5]A sheet of window glass 40x60 in. weighs about 26 lb.

[6]Window glass is sensitive to oxidinig or reducing conditions in the furnace somewhat less sensitive, however, than colored or flint glass.

[7]In this connection it would be well to note that the iron content of ordinary window glass is not considered important. Any amount of iron less than 0.25% Fe_2O_3 is considered satisfactory by the present demand of the market.

[8]See paper presented by J. R. Thoenen on limestone production as a mining problem before American Institute of Mining and Metallurgical Engineers February, 1925.

[9]Michigan Limestone and Chemical Co., Calcite, Mich. Marble Cliff Quarries Co., Marble Cliff, Ohio.

[10]Microscopic examination of the ground stone by A. E. Williams confirms this point.

The raw materials for sheet glass making must be of the most uniform quality. Experience has proven that even slight variations will produce striae in the finished sheet. Furthermore, in order that it may successfully resist weathering and surface decay (known as "fading") the best window glass is made with a minimum of alkali.[11] In molten glass of this character clay, and other earthy matter, will not readily dissolve. Such foreign matter, partially dissolved, produces "knots," "lines," "strings," and "stones" in the finished glass.

From the point of view of production losses involved, a few bits of clay found in a car lot of ground limestone, would justify the rejection of the entire car lot. A small amount of such foreign matter is fully as much a source of trouble to a window glass-maker as is a little excess "iron" to flint glass making.

Testing Car Load Shipments

In testing a car lot of material for contamination, it is useless to attempt representative samples. In fact, an effort should be made to pick samples for test from suspicious spots, off color stone, or in corners where segregation may have taken place; quite the opposite of regular sampling practice. In testing for contamination a chemical analysis is apt to be unreliable. For example, in a 90,000 lb. car lot of ground stone, one handful of clay would amount to less than 1/100 of one per cent but even that small an amount of foreign matter would ruin a considerable quantity of sheet glass.

It is obvious that the allowable variation in composition of the raw materials for glass making should not exceed the permissible error in weighing the batch proportions. The maximum error allowable in weighing batch for sheet glass making should certainly not exceed $\pm 0.4\%$.[12] This limit would permit an error of 8 lb. in weighing a batch based on 1000 lb. of sand.

In specifying a limestone it is rather futile to ask a quarryman to produce a stone of a given chemical composition. There are certain objectionable items such as iron, the maximum percentage of which may be specified, but a better practice so far as sheet glass making is concerned would be to determine first whether a quarry exposes a limestone suitable for glass making. A quarry selection and milling routine may then be specified which will enable the *quarry man* to produce the uncontaminated limestone, in a suitable size. In many cases it is, of course, a poor practice for customers to tell operators how to run the quarry. Limestone producers, however, are frequently unfamiliar with the real requirements of the glass trade and welcome any suggestions which will enable them to better satisfy their customers. It is ordinarily impossible to make a complete chemical analysis of every car load of limestone received at a window glass factory, nor is this necessary provided a careful inspection of the material be made in the car for contamination, and traces of foreign matter.

Burned Lime vs. Raw Limestone

In regard to the use of burned lime versus raw limestone for making sheet glass, there is little published data at hand on which to base a decision, although a considerable amount of window glass has been made from burned lime in the past few years.[13] There is little reason to think that the use of lime effects any material saving in heat or hastens the time of melting.[14] Incidentally, lime is generally more expensive than raw stone as a source of the lime bases.[15]

Items	Limestone	Burned lime
Net cost f.o.b. quarry or kiln	$2.00	$ 8.00
Freight to factory	2.00	3.00
Cost per ton delivered	4.00	11.00
Approximate total CaO and MgO	56%	97%
Cost per ton oxides delivered	7.15	11.35
Extra cost per ton lime bases from burned lime		4.20
Extra cost per ton glass melted 13.5% CaO, MgO		0.567

The extra cost of burned lime over raw limestone is thus seen to be about $0.50 per ton of glass made.

Use of Dolomite

There is likewise little data on the subject of substitution of dolomite for high calcium stone.[16] By far the larger part of the the sheet glass now made in the United States is made from high calcium stone.

In conclusion it may be stated that the proper place to begin the specification of a limestone for sheet glass making is at the limestone quarry. Chemical composition is at best a poor basis for specification. In view of the many very excellent sources of limestone in the United States, a limestone for sheet glass making should certainly contain 97% combined calcium and magnesium carbonates and less than 1% silica. Good window glass can be made, however, from stone less pure. In any case the ground material must be entirely free from any foreign matter, chert, flint clay, or overburden debris. For ordinary *green* window glass as much as 0.25% iron oxide may be tolerated although in good stone the iron content is generally much lower than this maximum limit. The proper size of the ground stone depends to a great extent on the mechanical equipment for handling the mixed raw materials. If segregation can be avoided, a coarse stone is to be desired[17] not only because it is less likely to be contaminated with a foreign matter but also because of the stirring action of the coarse stone in the melting of the batch in the glass furnace.

Note.—The author wishes to acknowledge the aid of Messrs. Flint, Shively, Scholes and others in the preparation of this paper.

[11] Eighteen parts Na_2O per 100 parts SiO_2. One of the chief objections to sheet glass made by some methods is the very high alkali content. The high alkali, however, gives a very clear glass free from stones.

[12] Some types of standard equipment will mix batch with an average error well under this limit.

[13] Turner and others, *Jour. Soc. Glass Tech.*, 5 [20], 188 (1921).

[14] Turner, *ibid.*

[15] Estimated extra cost of burned lime over raw limestone for making window glass. The major parts of lime or limestone which appear in the finished limestone are the lime bases CaO and MgO.

[16] Turner and others, *Jour. Soc. Glass Tech.*, 5, 352 (1921); 6, 101 (1922).

[17] Past 6-mesh and retained on 30-mesh is a good general size.

Crusher Run

IN an article on "Marketing Crushed Stone" in *Engineering and Mining Journal-Press*, H. B. Allen, district sales manager of the General Crushed Stone Co., Philadelphia, Penn., gives some interesting data on crusher operation. We presume his percentages are based on the operation of trap-rock crushing plants, for the percentage of screenings at many middle-west crushing plants runs as high as 20% instead of 7%.

"In the average commercial crushed-stone plant equipped with these screens to furnish railroad ballast, the production approximates: 35% of stone passing a 3-in. screen and rejected over the 2¼-in. screen and commercially known as railroad or road stone ballast; 25% of 1½-in. stone used for miscellaneous concrete construction and more generally in constructing the wearing surface of bituminous roads, which material is produced through the 2¼-in. screen and over the 1¼-in. screen; 18% of ¾-in. stone passing through the 1¼-in. and over the ⅝ in. screen, used extensively in concrete building and other concrete construction and also in connection with the repairing and oiling of bituminous macadam roads; 15% of ½-in. stone passing the ⅝-in. and over the ¼-in. screen, which is used principally in surface treating macadam and bituminous roads; and 7% of screenings, passing through the ¼-in. screen, of which size, owing to a limited market, the greater proportion produced is waste.

"Specifications for railroad ballast vary somewhat with the different systems. The product of the plant between the maximum and minimum screens is satisfactory to some roads, though in the case of others the inclusion of the sizes between the 1¼-in. and ¼-in. screen is not acceptable. In furnishing ballast stone for road construction, material produced through the 3-in. and over the 1¼-in. screen is usually specified, and for cement concrete road construction the product between the 3-in. and ⅝-in. screen.

"By reason of a fairly steady demand throughout the season for the ½-in. and ¾-in. sizes, which comprise about 33% of the total plant production, contrasted to a somewhat irregular market for the balance of the production or ballast and 1½-in. sizes, especially during the early spring and late fall, a higher price of from 15c to 20c per ton for the ¾-in. and ½-in. sizes is maintained. This price differential hardly covers the actual cost of reducing 100% of the production by recrushing to the latter sizes when necessary, nor does it cover the cost in the other alternative—namely to stockpile and rehandle the larger sizes, an expedient necessary in the event of unbalanced orders."

Sluicing Sand from Deposit to Plant

Moundsville Sand Company Has an Unusual Cableway Installation and Method of Conveying Sand to the Washing Plant

THE plant of the Moundsville Sand Co., 12 miles out of Wheeling, W. Va., is one of the most interesting small plants in the country. For one thing, it is the answer to what is becoming a common problem in the business; that is, what to do with a plant when the deposit for which it was built is exhausted. Again it has a very clever answer to another problem, that of linking up a plant with a deposit on the other side of a railway or highway.

The original plant operated by the company was built on a railroad between the tracks and the main highway that leads from Wheeling. The deposit was on the same side of the highway as the tracks and there was plenty of room for everything connected with the operation. In the course of six or seven years this deposit became exhausted and the company had to begin operations on another deposit on the other side of the highway. In this new situation there was only a narrow space between the tracks and the highway on which to build a plant.

The deposit was worked by a dragline cableway excavator and the question was how to convey the material from the deposit across the highway. Naturally it would not do to run the dragline bucket over a much used road. The method finally adopted was that of putting a 16-in. pipe under the highway and sluicing the sand through the pipe to the plant with a stream of water.

The digging is done by a cableway 1-yd. bucket, designed by Raymond W. Dull, to whom the sand and gravel industry owes so much for his engineering work during the early life of the industry. It is operated by a two-drum Mundy hoist, steam driven. The sand falls from the bucket to a pile which is at the upper end of the big pipe and it is played upon by two streams of water, one from a Nye steam pump, the other from a direct acting steam pump. There is a grat-

The bucket in position for discharging and the streams of water that sluice it into the pipe. The inlet of the pipe is covered by a screen

Left—The deposit. The highway which separates the plant from the deposit is marked by the telephone poles. Right—The hoist house and the short tower which is all that is needed as it stands on the ridge

ing on the end of the pipe to keep out trash and large stones, but everything else is washed through the pipe and into the boot of a 12-in. bucket and belt elevator which feeds the plant.

From the elevator the sand and water go to a Dull scrubber which not only scrubs the sand but breaks up any lumps which ma have withstood the passage through the pi... The scrubber discharges into a Dull conical screen, about the same as the screen made by the Link-Belt Co. today, with ⅜-in. perforations. Everything coarser than ⅜-in. is sent to the gravel bin.

The sand either goes to a Dull cone, to be settled out and sold as "commercial sand," or it is sent to a bucket and belt elevator which lifts it to a screen covered with ⅛-in. wire cloth. The oversize of this screen is sold as "pea gravel," which is used in this section for road dressing, and the undersize is sold as plasterers' sand.

The bins are low and are set on the ground so that everything that is loaded into cars has to be elevated. There are eight elevators altogether in this small plant, which is a feature that might be criticised. If the bins had been set higher, so that the sand could run to the cars by gravity, several of these elevators might have been dispensed with. On the other hand, these short elevators, of the bucket and belt type, give very little trouble, and as they are not in continuous use the wear on them is not great.

Elevators and screens are run by a gasoline engine made by the National Transit Co.

Left—The plant on the side at which the pipe enters. Right—The pipe and elevator boot

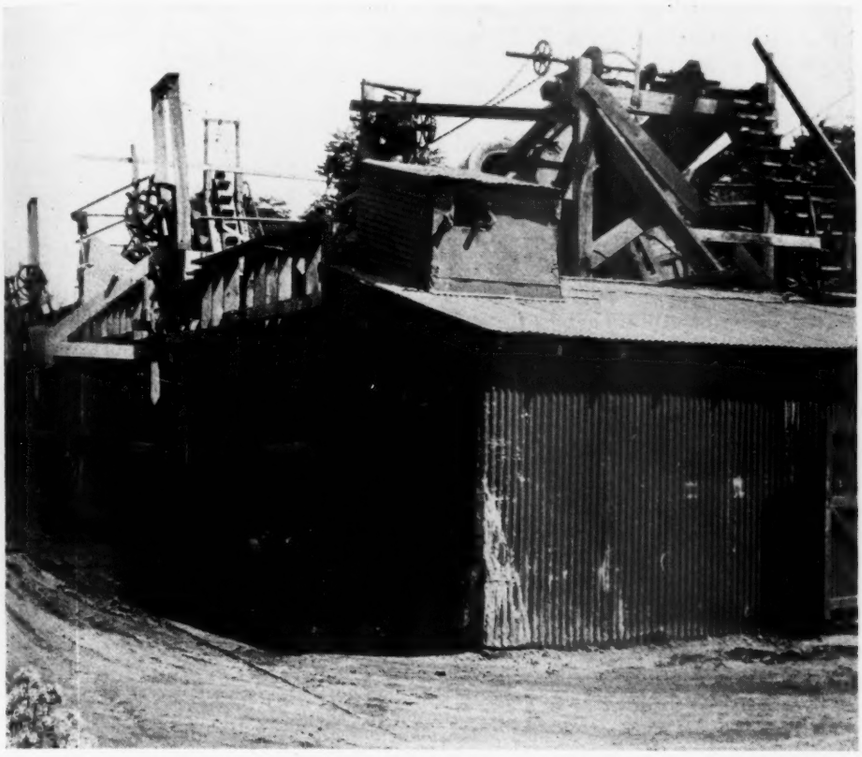
Left—Gravel screens above the bins. Right—The sand screen and elevator that serves it

The way the dragline is installed is interesting. As there is a high ridge between the plant and the deposit, a tall mast was not needed. Its place is taken by a tower built of timber, about 20 ft. high. The ropes are brought down the side of the tower and pass through sheaves before going to the drums of the hoist. The deposit is now being worked to a depth of approximately 80 ft.

The whole installation is a good example of the way material from an old plant may be utilized and made to do good work in a new location. The method of sluicing the sand through a pipe is a very practical one.

Both sand and gravel may be handled in this way, but with gravel it would be necessary to see that the pipe had sufficient fall so that the gravel did not drag on the bottom, which would tend to choke the pipe.

The officers of the company are Walter H. McGlumphy, president; A. C. Swift, manager, secretary and treasurer, and Harry Bonar, superintendent.



The railway side of the plant showing elevators that lift sand and gravel to the loading chutes

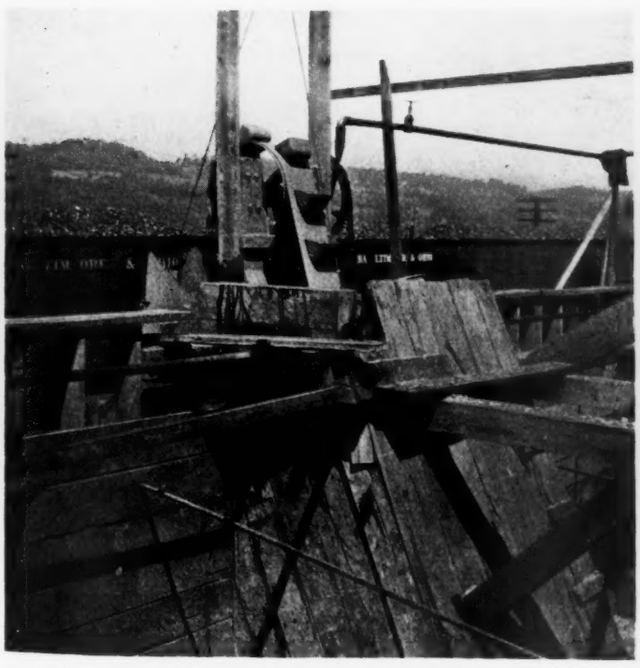
Novel Sand and Gravel Plant Near Hornell, N. Y.

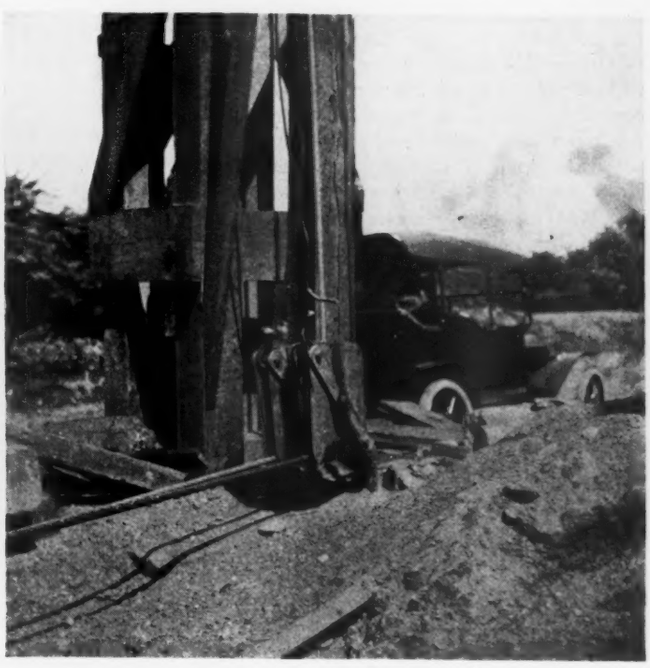
ACCORDING to the *Hornell (N. Y.) Tribune*, The Alfred Sand and Gravel Corp. is completing its new plant near Alfred Station, which is not far from Hornell, N. Y. This is almost unique among sand and gravel plants in its employment of a cableway 1800 ft. long for conveying the bank material to the screening plant. This cableway is supported on nine towers and crosses two highways and a railroad. The buckets are of 1-ton capacity and are filled by a 1-ton gasoline-driven shovel.

The plant, according to the same paper has an unusually large bin capacity, which can store 800 carloads of sized material. The bins together form a block 200x400 ft. and all are connected with a belt conveyor system so that material from any bin may be loaded into cars.

The output of the plant will be 2500 tons per day. Although this is a "dry" plant, abundant tests have shown that the product is as free from dirt as the usual washed material and that it passes every test for concrete and plastering requirements. It has been accepted for use in highway construction in New York and Pennsylvania.

The firm known as the Alfred Sand and Gravel Corp. is composed of E. W. Sterret and William J. Schweiger.





Left—Inside of a gravel bin showing loading elevator. Right—Lower part of dragline tower showing how the ropes pass through a sheave at the bottom

Important Meeting of Rock Products Committees of the A. S. T. M.

Getting Ready for Annual Meeting When Proposed Changes in Present Specifications Will Be Acted Upon

MEETINGS of the twelve committees of the American Society for Testing Materials, in the Non-Metals Division, were held at the Bellevue Stratford Hotel, Philadelphia, Wednesday, Thursday and Friday, March 25, 26 and 27. They were attended by about 200 members and visitors, comprising engineers and technical experts from the principal cement plants of the country, stone and gravel producers, tar and asphalt companies, public utilities, municipalities, and the Federal Government. The national officers of the Society, President, F. M. Farmer, New York City, Vice-President, W. H. Fulweiler, Philadelphia, and the Secretary-Treasurer, C. L. Warwick, Philadelphia, were present and addressed the meetings.

Specifications for Portland Cement

Committee C-1 on Cement held a well attended meeting on March 25, at which 40 of its members, coming from all sections of the country, were present out of a total membership of 59. General discussion centered upon the Society's standard specifications and methods of test for portland cement, which have been approved as American standard specifications by the American Engineering Standards Committee. The comments of many members and certain reports mentioned below brought out sharply that one of the biggest problems before the committee today is to devise further means for improving the degree of uniformity obtained in tests of cement throughout the laboratories of the country. The committee has been at work upon a handbook or manual which elaborates in considerable detail the directions in the specifications for making the several tests called for, that is, fineness, soundness, time of set, and tensile strength. Ernest Ashton, chemical engineer Lehigh Portland Cement Co., Allentown, Penn., chairman of the sub-committee in charge of this matter, stated that the manual was practically completed and would be submitted in tentative printed form for consideration of the committee at its next meeting.

Another interesting feature of the meeting was the consideration by the committee of the recently proposed Master Specifications for cement that have been issued by the Federal Specifications Board. The Master Specifications have not changed the actual requirements of the standard specifications but in many cases have elaborated upon the methods of testing in somewhat the same way that the committee itself has done in the above mentioned handbook.

Reports from the following sub-committees are worthy of mention:

Sub-Committee on Specific Gravity—The sub-committee has recommended that the requirements for specific gravity be dropped from the specifications. This recommendation has been approved by the committee and will be submitted to the Society at the time that other recommendations respecting the specifications are made.

Sub-Committee on Fineness—J. C. Pearson, assistant to chemical engineer, Lehigh Portland Cement Co., Allentown, Penn., the chairman of the sub-committee, reported that they have been making some studies on the relation of fineness to strength and have presented some interesting data for consideration by the sub-committee on strength. They have recommended the adoption by the committee of a new series of testing sieves that are being brought out by Committee E-1 on Methods of Testing. The committee has planned a study of the standard Ottawa sand with the use of these new sieves with the object of so fixing tolerances that the present standard Ottawa sand may be used without modification.

Sub-Committee on Strength.—P. H. Bates chemist, U. S. Bureau of Standards, Washington, chairman, reported the results of an extensive series of strength tests made by seventeen co-operating laboratories. These tests included compression tests of cylinders and cubes and tension test of mortar briquettes, with different consistencies of mortar, different proportions and at different ages. The magnitude of this work will probably be appreciated by the fact that the number of specimens involved in this series alone is approximately 40,000. The results bear on the methods of testing but inasmuch as the sub-committee did not have an opportunity to work up these data, it is too soon to state any conclusions. In the meantime the sub-committee has been directed to tabulate and study these data, for which Committee C-1 has appropriated the necessary funds.

In this same connection F. H. Jackson, senior assistant testing engineer, U. S. Bureau of Public Roads, Washington, D. C., presented an interesting paper giving in detail results of a series of comparative tests in some fifty laboratories which bear upon the work of Sub-Committee VII on Strength. One of the objects of this investigation was to determine the degree of conformity applying the standard tests to identical samples prepared and sent out by the Bureau of Public Roads and tested in accordance with the standard methods. The purpose of the paper was to point out to Committee C-1 some of the methods of testing that needed elaboration.

As a result of the discussion of these two series of tests certain investigations supplementary to those now in progress were discussed and were referred to the sub-committee for consideration.

Sub-Committee on Natural Cement.—E. L. Conwell, president, E. L. Conwell & Co., Philadelphia chairman of the sub-committee, reported progress and promised further information on the subject of natural cements at the next meeting.

So much business of importance developed at this meeting requiring further consideration of the committee before it could be determined to hold another meeting in New York City on May 15, at which further data now in course of preparation will be reviewed and the committee's annual report prepared.

Concrete and Concrete Aggregates

A new sub-committee has been appointed on design. There are at present a number of theories governing the design of concrete mixtures. It is the work of this new sub-committee to align these various theories. The committee is working on new specifications for aggregate and on specifications for concrete. In order to aid in the securing of data on available deposits of aggregates, a form has been prepared on which to record the essential information concerning any deposit. This should serve as a guide in getting specific information.

A sub-committee, which is carrying on a study of various natural or artificially occurring materials in concrete which may affect it deleteriously, will compile as a first step of bibliography on the effect of these various deleterious substances. Such materials include organic impurities, impure water, etc.

Another sub-committee is studying the effect of various admixtures in concrete. It believes that its first efforts should be the preparation of a standard method for de-

termining the weight per cubic foot of the various powdered admixtures, since at present there is no method that has been agreed upon as a standard method. It will carry out a series of co-operative tests in which nine laboratories will determine the weight per cubic foot of powdered talc, oil shale hydrated lime and diotamaceous earth, by the rodding method and direct compression method and compression by means of jigging. The sub-committee will ultimately look into the effect of these powdered admixtures on the strength of the concrete, including in this investigation the effect of similar additions of portland cement.

The durability of concrete under various conditions is a subject of great economic importance. If some concrete will stand up much longer under a definite set of conditions than other concrete, it would be enlightening to know the reasons. It may be that certain precautions can be taken to insure greater durability. One suggestion to accomplish this is a *soundness test* for aggregate. This is a sodium-sulfate test used to simulate freezing and thawing conditions. Any accelerated test would be very helpful.

Road and Paving Materials

At the meeting of Committee D-4 on Road and Paving Materials considerable attention was given to the question of subgrade soils. The committee is recommending a tentative field method for determining moisture equivalent of subgrade soils, which is the most indicative test of the suitability of the soil to serve as a subgrade of a road. By its use can be determined what special treatment may be given to the design of the pavement.

The committee voted to recommend to the Society at the annual meeting that the tentative method of test for consistency of portland cement concrete for pavements or for pavement base (D 138-22 T) should be advanced to standard as this test is significant in controlling the strength of concrete. It should be pointed out that it has been found that wet mixtures are greatly inferior in strength to those containing a lesser amount of water. By the use of this proposed method a higher quality and more concrete is possible.

The committee is making a strong effort to produce a standard for commercitl size broken stone, slag and gravel. There is possibility of considerable economy in the elimination of unnecessary screen sizes in commercial producing plants. At present plants are forced to carry in stock a large number of screens, which could be replaced by a comparatively small number.

The committee is also engaged in the preparation of specifications for gravel, stone and slag for various types of construction and it is giving considerable study to the design and methods of testing bituminous concrete mixtures.

Slate Specifications

The committee considered methods of testing slate for water absorption, which have been in course of preparation since the annual meeting of the Society last June. These methods specify size, number and preparation of specimens, describe in detail the procedure, that is, drying, initial weighing, immersion, computation and reporting of results and make provision for an alternate method in which the standard 48-hour immersion in water is supplanted by boiling in water for eight hours. The committee has adopted test specimens 6x6 in. measured along the cleavage plane and ¼ in. in thickness. This form of specimen is more typical of slate in its method of application and use than the cubical specimen used for absorption tests on such material as granite and marble.

There was considerable discussion regarding the preparation of the surface and the method of drying after immersion, and the committee decided that the surface should be honed finished since such a finish would make possible more uniform results. It was also decided that surface drying after immersion should be done with a cloth instead of by the use of an electric fan as had been proposed by some members.

It has been proposed to require that six specimens be submitted, each to be representative of the particular kind of slate under consideration, as distinguished from selection of samples from different parts of a quarry, in which there may be variations in the slate.

The method will be referred to letter ballot of the committee and if approved will be recommended at the annual meeting of the Society in June for acceptance as tentative.

The committee next considered methods of flexure testing of slate under two headings: (a) determination of modulus of rupture, and (b) determination of modulus of elasticity. These methods specify in detail the test specimens and the procedure to be followed. Although it was originally proposed that the specimens for determination of modulus of rupture should be 12x4x3/8 in., the committee finally decided, upon the recommendation of representatives of the electrical industry, to adopt a specimen 12x1¼x1 in. The thickness of 1 in. represents a general standard of stock as used particularly in switchboard work and it was pointed out that to adopt the thinner size would require splitting in order to obtain the thinner specimens. By adopting the 1-in. thickness, values are obtained that are comparable with the actual conditions of use of the slate.

It was also pointed out that the strength of slate was slightly different in the direction of the grain and crosswise to the grain, and accordingly the committee has decided to require of any lot of slate three tests with the grain and three tests crosswise to the grain; each specimen to be tested perpendicular to the plane of cleavage. This practice is the one which is very generally followed in the electrical industry.

In the tests for modulus of elasticity, the thinner specimen, that is, 12x4x3/8 in. has been adopted because the determination of modulus of elasticity can only be made accurately with a specimen that is sensitive to deflection under load, and the 1 in. thick specimen adopted for the modulus of rupture test is not sufficiently sensitive for the determination of elasticity.

The committee also reviewed a paper by Robert Notvest of the Structural Slate Co. and Dr. H. S. Booth of the Western Reserve University on "The Testing of Slate for Hardness," which had first been presented to the committee in June, 1924, by Mr. Notvest. Because of its general interest and importance the committee has given authority to the authors to publish this paper, with the imprint that it was presented to the committee and has been issued under its authorization. The committee believes that this paper is a valuable contribution to the subject of hardness testing of slate and the paper will be studied by the committee with a view to preparing ultimately a method of hardness testing of slate.

Chairman Kessler referred to the benefit that had been derived at the meeting by the co-operation of the slate producers and pointed out the advantage which the work of the committee can be to the industry as a whole, not only through the development of methods of test, which are at present occupying the attention of the committee, but in other ways as well, as for example in the establishment of standards that could be used as a guide in the development of new quarry operations.

A subject that will engage the attention of the committee in the future is that of weathering or coloring in slate. It was reported at the meeting that the National Slate Association has been doing some work on this subject, and Mr. Kessler agreed to report later on this feature, which is of special interest to architects and builders.

A Modest State

FROM the bulletin published by the state department of agriculture we reprint these paragraphs about a few of Oklahoma's natural resources:

Oklahoma has limestone enough to burn all the lime and furnish all the crushed rock for the United States.

Oklahoma has asphalt enough to pave every paved road and street in the state.

Oklahoma has enough salt water going to waste to make 100 carloads of salt daily.

Oklahoma has gypsum enough to keep 100 mills busy for 34,000 years.

Oklahoma has granite enough to supply the building and monument trade of the country.

Oklahoma has coal enough to last 26,000 years at the present rate of mining.—*Tulsa (Okla.) Tribune.*

National Agstone Association Holds Special Meeting

THE National Agstone Association held a special meeting at the Deshler Hotel, Columbus, Ohio, on March 27, the purpose of which was to afford a general get-together of members of the association with representatives of the State Farm Bureau and Ohio State University. The meeting alos served as a farewell party to Harry G. Beale, service manager of the State Farm Bureau, who resigned from the service to go with the American Milling Co. It has been through Mr. Beale's efforts that the Agstone association has received the wholehearted co-operation of the bureau.

An important feature of the meeting was the reading of a report prepared by the Ohio State University covering the consumption of liming materials in Ohio in 1924. The tonnage for 1924 was 212,000 as against 170,000 tons in 1923. While this amount represents a gain of approximately 20%, members realize that they have a long road to travel to reach the saturation point, since the state university estimates that the state's yearly requirements are approximately 3,000,000 tons.

Announcement was made at the meeting that six new members have been admitted into the association since January 1. These are: Casparis Stone Co., Columbus, Ohio; Columbia Quarries Co., St. Louis, Mo.; American Limestone Co., Knoxville, Tenn.; Wallace Stone Co., Bay Port, Mich.; T. K. Morris Stone Co., Pittsburgh, Penn.; Texas Stone Co., Dallas, Texas.

Those who attended the meeting were: J. C. King, Carbon Limestone Co., Youngstown; E. M. Lamkin and C. G. Peck, Kelley Island Lime and Transport Co., Cleveland; Leo Poorman, France Stone Co., Toledo; Wm. H. Margraf, Marble Cliff Quarries Co., Columbus; W. E. Stone, Ohio Marble Co., Piqua; F. J. Colgan, Colgan Stone Co., Columbus; A. P. Sandles, Ohio Macadam Association, Columbus; Claude L. Clark, assistant secretary, National Agstone Association, Columbus; H. G. Beale, State Farm Bureau of Ohio; J. A. Slipher, Earl Barnes and Earl Jones, Ohio State University, and George M. Earnshow, ROCK PRODUCTS, Chicago, Ill.

Reopen Limestone Quarry Near Winnfield, Louisiana

THE Southern Mineral Co. has resumed the operation of its quarry five miles west of Winnfield, La., at Winn parish. The plant consists of three crushers and has a capacity of about 1500 tons per day. The company operates its own railroad from Winnfield to the quarry. Crushed limestone for agricultural and concrete aggregate purposes are produced. A description of this operation was published in ROCK PRODUCTS in 1922. It is said to be the only limestone deposit on the Mississippi River below Cape Girardeau.

New Lime Company Formed at Davenport, Iowa

ARTICLES of incorporation of the United States Lime Co. of Davenport, Iowa, capitalized at $50,000, have been filed in the office of county recorder A. E. Lindquist.

The corporation has been organized for the purpose of buying lands containing marble stone, gypsum rock, limestone and clay deposits and to develop quarries producing all sorts of building and paving materials.

F. H. G. Perry of Davenport is president of the company and N. C. Perry of Moline, Ill., vice president. O. B. Perry of Rockford, Ill., is secretary and treasurer. The officers named compose the board of directors. The articles of incorporation were filed by Sampson & Dillon, Des Moines attorneys.

Limestone for Missouri, Oklahoma and Kansas Soils

UNTIL recent years the soils of Missouri, Oklahoma and Kansas had little need of limestone treatment, but acidity is gradually becoming effective in the land, due to the formation of acids from the organic decomposition and newspaper reports, show decomposition and newspaper reports show cultural limestone in these states this year.

In Missouri, two carloads of agricultural limestone have been received by farmers in St. Charles county, where a community crusher is also being operated. The first carload ever shipped in to East Prairie has been pooled among farmers there. A carload has been ordered by a group of farmers from Maysville, Amity and Pattonsburg localities. Clay county farmers have formed a co-operative association and purchased a crusher. A. L. Houghton has contracts for over 300 tons of limestone from farmers around Kingston and will buy and operate a pulverizer if orders for 500 tons are secured.

In Oklahoma, two carloads have been received by Henryetta farmers and a third ordered. Payne county farmers shared a carload with the department of agriculture of the Oklahoma Agricultural and Mechanical College. Kingfisher community farmers have purchased several carloads and Rogers county has received one car.

In Kansas, the Montgomery county farm bureau is organizing the farmers there and plans to have 250 members and will buy a pulverizer with the aim of developing 35,000 acres of legumes in the county within five years. At present the acreage totals about 9000. Farmers around Helper have purchased a pulverizer from Bourbon county for use this year. In other localities there is considerable talk of the advisability of treating the soils with limestone, though farmers seem rather reticent in recognizing its importance.

Geological Survey Shows Good Lime Industry Possibilities for Florida

PRACTICALLY all of the lime produced in the two plants in Florida, located in Marion county, is absorbed in the state's four sand-lime brick plants so that very little of its burned and hydrated lime gets into commerce as such, while the state produces but 40 to 50% of the lime that it consumes. These facts were gleaned from a report of a survey conducted by the state geological department under the direction of Stewart Mossom in a dispatch in the *Jacksonville (Fla.) Journal*. The survey showed that lime could be produced commercially in thirteen other counties than Marion, namely Dixie, Suwanee, Levy, Hamilton, Washington, Lafayette, Columbia, Pasco, Dade, Citrus, Sumpter, Hernando and Jackson.

"The soft nature of the Florida limestone rock makes it possible to burn the rock under small production conditions without expensive machinery," Mr. Bossom stated. He also pointed out that the demand for lime for construction in the state has increased more rapidly than production in the lime industry.

National Lime and Stone Company Buys Brokensword Stone Company

THE National Lime and Stone Co., of Carey, Ohio, has purchased the Brokensword Stone Co., of Bucyrus whose quarry and plant are at Spore, Ohio, through negotiations by R. G. Spencer, general manager. The purchase was confirmed at a stockholders meeting of the Brokensword company after all arrangements had been made.

The Brokensword Stone Co. was established about 20 years ago by the late A. J. Sawyer of Bucyrus. I. Nussbaum was president and F. J. Quilter was secretary and superintendent. Mr. Quilter will remain in charge of the plant according to unofficial reports.

New Company to Operate White Cliffs, Arkansas Lime Plant

ANNOUNCEMENT of the organization of the White Cliffs Corporation of America, succeeding the Krippendorf-Tuttle White Cliff Products Co., has been made by Martin Walsh, receiver for the latter concern. Commencement of operations under the new name was set for April 1.

The production headquarters of the company are at White Cliffs, Ark., some 40 miles from Texarkana. Principal products are lime and fertilizer, manufactured from the deposits of limestone clay which the company owns.

According to Arkansas newspapers the company has solved the fuel problem and feels confident of the successful operation.

A Double Unit Sand and Gravel Plant

Eaton-Kastor Gravel Co. of Indianapolis Has a New Plant with Many Unusual Features

THE Eaton-Kaster Gravel Co., is one of the older producing companies in Indianapolis, Ind., and for a number of years has operated a plant where Morris street crosses Eagle creek. Early last winter the company began the erection of a new plant on the other side of the creek from the old plant and this is now ready to begin production.

The plant contains the features which are common to almost all the plants in and around Indianapolis. The material is dug by cableway dragline buckets, is washed and separated over gravity screens and the sand is settled in automatic sand settlers. But these plant elements have been applied in a new way and to a general design that is decidedly novel.

The design is due principally to Ben Rush, the plant superintendent, who has been with the company a long time and for many years in sand and gravel production. He built it without drawings, the kind of a job that makes an engineer wonder whether his work is so necessary in plant design, since so good a plant is sometimes built without it.

The plant is rather unique in being of two-unit design, or put in another way it consists of two complete plants set side by side, alike in every respect from the dragline bucket to the tailings trough. This two-unit system has a number of advantages in an industry in which production varies with the season, as it does in the sand and gravel industry. It is not necessary to run the whole plant when only a half-production is needed to fill orders.

Steel-Towered Draglines

The dragline buckets are back-dumping Pioneer buckets made by the Mansfield Engineering Co. of Indianapolis. The ropes lead to two 92-ft. steel towers and then pass to two hoist houses each of which contains a two-drum Thomas electric hoist with a 100 h.p. motor.

In front of each mast is a hopper supported on a tower separated from the Main plant. Into these hoppers the buckets dump. There are sliding doors in the bottoms of each hopper out of which the material falls on an apron with about 3-in. to 1-ft. slope. A stream of water from an 8-in. American Well Works deep well pump, powered with a 35 h.p. Howell motor, washes the material down the apron to a sluice through which it flows to the "screen houses." The pump throws 850 g.p.m. A Fairbanks-Morse 4-in. pump with a Fairbanks-Morse 25 h.p. motor is used as an auxiliary

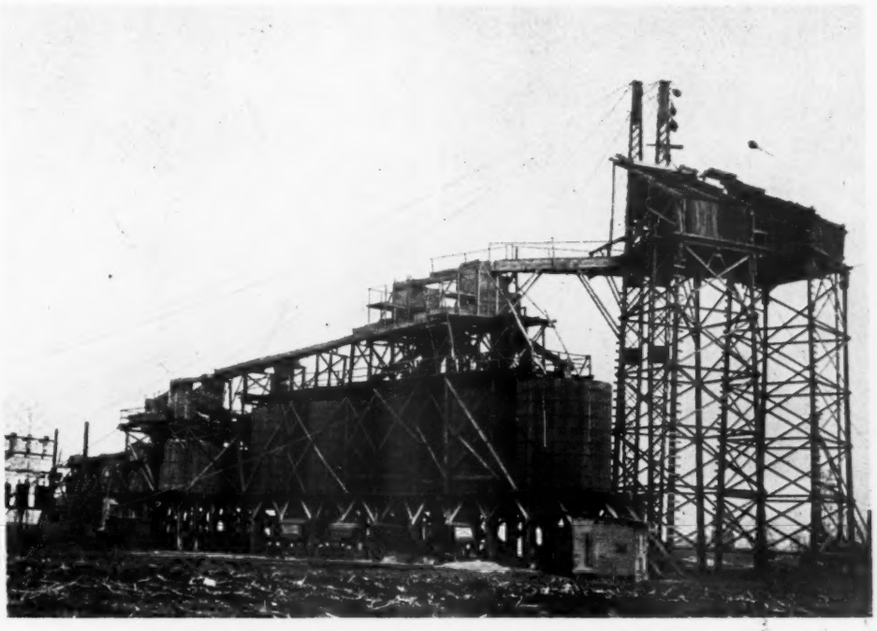
There are two decks above the bins of the plant and the "screen houses" are erected on the upper deck. Each house contains three gravity screens set parallel at about 40 deg. inclination. The coarsest screen takes out the oversize which goes to a small bin below. There is not enough of this oversize to be worth crushing, so it is used on road work and the like around the plant.

Gravity Screens

The screens below take out two sizes of gravel and sand, the size of screen being changed according to the order that is being filled. All screens are slot screens. The finest that is used has a 1/12-in.x¾-in. slot, and this is used to make sand for tile setting and some kinds of plaster work. Generally the concrete sand and "grits" are taken out together and separated by "grit" screens on the lower deck. There is an arrangement by which excess sand may be shunted off to a waste flume when this is desired.

The gravel from the screens flows to bins. The sand and "grits" flow down a trough with the water to the "grit" screens on the lower deck. These too are gravity screens with a ¼-in. by ¾-in. slot. The undersize (sand) goes to a Telsmith automatic settling tank, the overflow of which goes to waste. The oversize of the screen goes to an automatic dumping device on the order of the "tilting box," which Mr. Rush made from his own ideas.

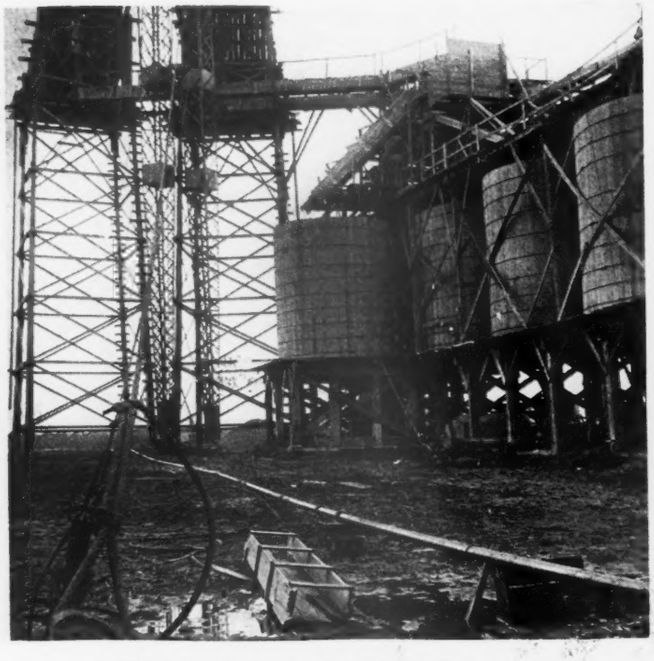
The gravity screens in this plant are set so that the angle may be varied easily, according to the character of the material that is fed to them. Changing screens is a simple matter of sliding one screen out and



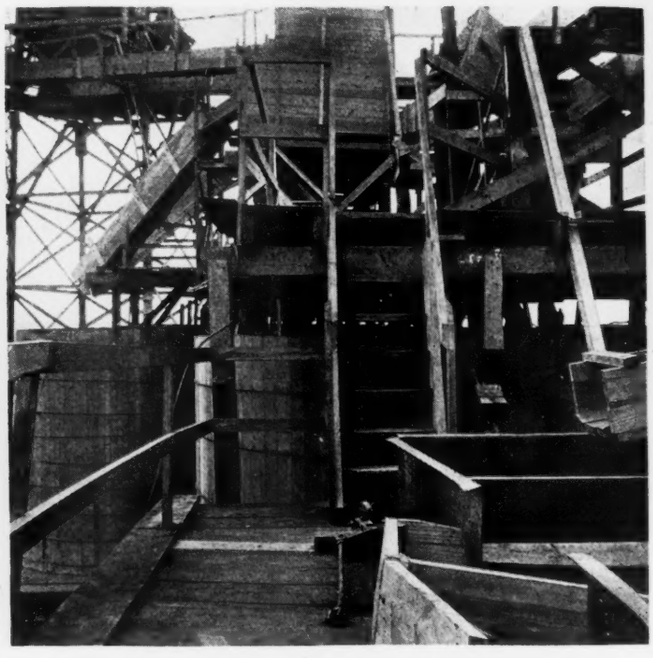
Eaton-Kaster Gravel Co. plant, Indianapolis, Ind.

Two hoist houses with pump house between

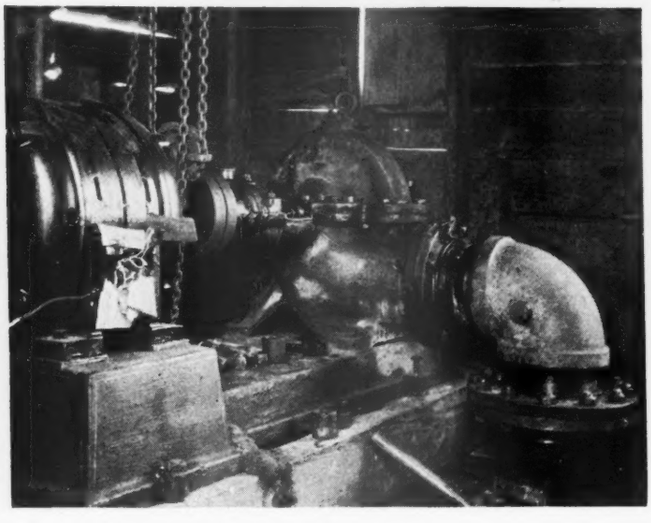
Concrete pavement into plant—Whole plant is on concrete slab



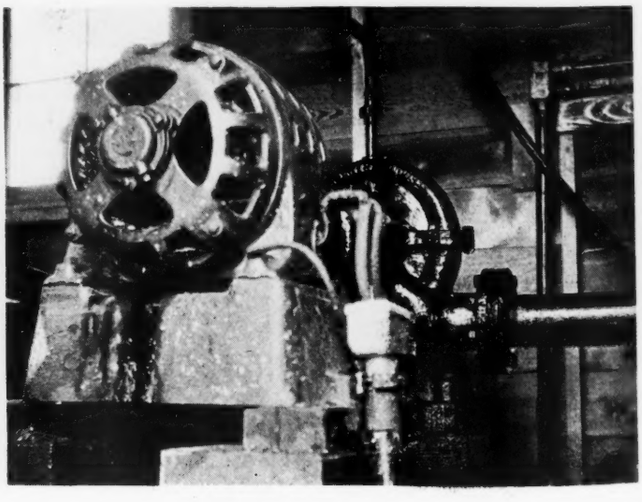
Wood-stave silos and steel dragline towers



View from sand deck showing screen houses below



Deep-well wash water pump



Supplementary 4-in. water pump

another screen in to take its place.

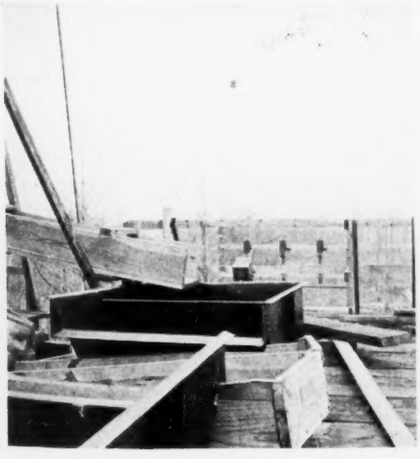
The bins are wood stave silos, an unusual thing to find in a sand and gravel plant. The staves are of cypress which resists the effects of wetting and drying longer than most woods do. Gravel silos are 16 ft. in diameter and 18 ft. high and sand silos are 14 ft. in diameter and 10 ft. high. The old plant had silos for bins so their use in this new plant is no experiment.

Whole Plant Rests on Slab of Concrete

The silos are supported on 12x12-in. frames of southern pine and these rest on

Grit screen and chute to sand settling tanks

posts of the same size and material. The posts are carried down to bolsters also 12x12-in., which rest on a solid slab of concrete that extends under the entire plant. The edges of this slab slope away to gutters so that any dirt and spill from above, such



Automatic sand-settling tank

as may come from loading trucks, can be washed away. The bottom of each silo has two segmental gates for truck loading.

A new concrete road is being built into the plant and this will connect the slab under the plant so that the truck will always have a firm footing.

A Compliment for the National Crushed Stone Association from Our British Cousins

Think Programs Offer Plenty of "Food for Thought"

HEADED by a portrait and facsimile autograph of Secretary A. P. Sandles, *The Quarry Managers' Journal* of the British Institution of Quarry Managers, under the title "The National Crushed Stone Association, U. S. A.," says:

"We do not think our contemporaries across the sea can give us points in point of numbers present at their Annual Convention, but we admit they can in other respects. First their printed 'Daily Bulletin' containing a report of the previous day's business. Then their ability to get through the business. We must be as slow as a nervous lady rushing to a dentist in comparison with our friends. What was it? Two papers and discussions in a whole morning's session at our last Conference, and a whole hour-and-a-half absolutely wasted at luncheon. Wonder what our members would say if we offered them the following programme just to come between the ordinary day's work:

* * * * *

(Here follows a copy of the ambitious program of Agricultural Lime and Limestone Group).

* * * * *

"Eh, What? We run our Conference for a week; but it is fairly certain that if we went at this speed, before Friday 90 per cent of our members would be in hospital—or the asylum. And they do not believe in the eight hour day at Conventions; they begin at 8 a. m. and finish in this way:

"8 p. m.: Motion Pictures.

"9 p. m.: to Low Twelve: Smoker and Vaudeville entertainment.

"Not 'slow motion pictures' we guess.

"You see they get moving with the lighter side as well as the serious side of the day's work. We do not exactly know what 'low twelve' means, but presume it is 12 midnight; high twelve being mid-day, about which hour they are just getting nicely into their stride for the 'few remarks' to be made between 1 and 2:30 p. m.

"According to the programme the menu at the Luncheon on this day was:

"Eats: "What they gave us."

"Dessert: "Shop Talk."

"Demi-tasse: "Swap Experiences."

"Then they began to get on with the business:

"2:30 p. m.—3.00 p. m.: Directors' Report continued.

"3:30 p. m.: General Business.

"You must not conclude that an opening day's program such as we have sketched above leaves the Conventionists exhausted. Not by a long way. That is only a preliminary canter, and the second day they begin to take an interest in things. No doubt having felt that an hour-and-a-half was all very well in its way for the opening luncheon; but to get a real, good square meal it requires at least two hours. And we agree, when one has to take part in discussions on a dozen different subjects as relish to the lunch. The following was the Luncheon program for the second day:

* * * * *

Another of E. M. Lamkin's programs!

* * * * *

"Note that last line: 'Everybody invited.' Well, we were not included in that general invitation, but had a special invitation to be present, and only wish we could have accepted it. But Providence providing the cash—we mean to be there next year; and if the Institution of Quarry Managers thinks anything of its General Secretary it will see that Providence does provide.

"We congratulate Mr. A. P. Sandles and his fellow members on the great success of their Convention, and thank him for his courtesy in sending us a copy of the program and the 'Daily Convention Bulletins.' In his covering letter, Brother Sandles says:

> " 'We had a great meeting. Wish your crowd could have had a representative there.'

"Well, you see what we say about this above, and it will give us the greatest of pleasure to come across next year—Providence providing—and see how you manage to do it.

"One particular thing gave us particular pleasure. In the report of the Banquet we find: 'Three hundred plates; ladies present; active and associate members broke bread together; music, song and story. Two Flags *Old Glory* and the *British Union Jack*, were *Guests of Honour.*'

"Hands across the sea! We appreciate the thoughtfulness that laid the Union Jack side by side with Old Glory as guest of honor at the banquet. After that we *must* go there next year.

"If any members of The National Crushed Stone Association intend visiting the Old Country this year, we suggest they try to make it in July. Our Annual Conference takes place then, and although we cannot promise twelve discussions during lunch, we will promise that we will do our very utmost to make their visit a pleasurable one in our own old slow fashion. This is an open invitation. COME!"

The Effect of Moisture in Sand

A Factor that Must Always Be Considered in Proportioning a Concrete Mixture

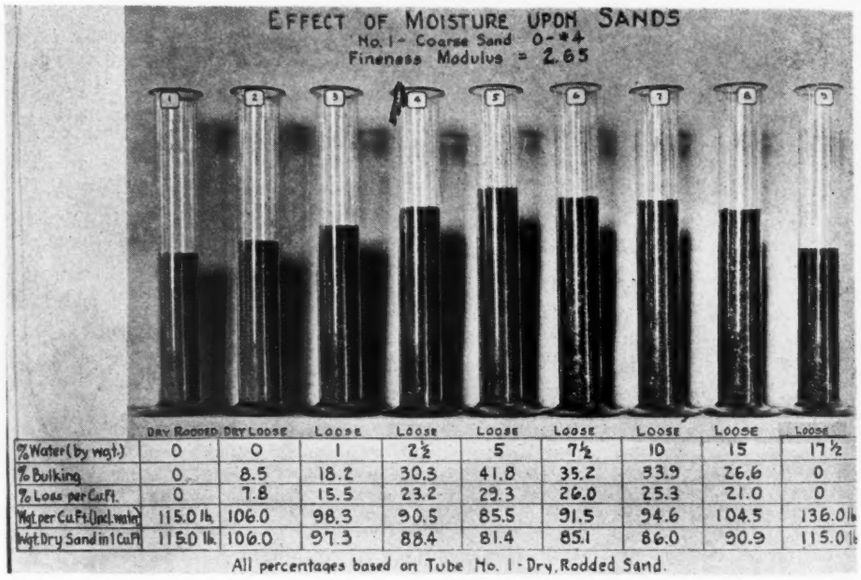
By R. R. Litehiser
Railways Bureau, Portland Cement Association

THE object of proportioning water, cement, and fine and coarse aggregate in a concrete mixture is to place in it *definite* amounts of each. Extensive laboratory research has established that definite proportions of all these ingredients (including the water) are fundamental to uniform quality and strength in concrete. In the laboratory, aggregates are measured "dry and rodded," in which condition a cubic foot of an aggregate has a practically constant weight. Proportions in which the aggregates are measured "dry and rodded" will therefore insure definite amounts of each in the mixture.

Aggregates in the field are piled loose, usually damp and at times wet. It is common practice to measure the aggregates damp and loose from the piles. Every engineer, inspector or foreman on a concrete job has observed that moisture in sand caused it to bulk or increase in volume, while it had practically no effect on the volume of coarse aggregate. At the same time it was no doubt observed that proportions which gave concrete of the desired workability one day with one lot of aggregates, gave concrete that was harsh and difficult to handle another day. It was not uncommon to lay the trouble to the moisture in the sand, but the magnitude of the effect of the moisture was by no means clearly understood.

An experiment was accordingly planned which would show the effect of moisture in sand. In order that the experiment might be sufficiently general, three sands were used, viz., a coarse sand graded from 0 to ¼-in. and designated as 0-No. 4, a medium sand graded from 0 to ⅛-in. and designated as 0-No. 8, and a fine sand graded from 0 to 1/48-in. and designated as 0-No. 48. Each was thoroughly dried before the experiment began and varying amounts of moisture added to successive samples of equal weight of each sand. These samples were then placed in glass hydrometer jars and photographed. Figs. 1, 2 and 3 show the effect of moisture and loose measurement on coarse, medium and fine sand respectively. The procedure in showing the effect of moisture in each grading of sand is explained in the following paragraphs in order that Figs. 1, 2 and 3 may be clearly understood.

Nine samples of equal weight were taken from each sand. As previously mentioned, a given weight of an aggregate in a "dry, rodded" condition occupies a practically constant volume. One of the samples was accordingly "dry rodded" into jar No. 1 to establish a definite standard with which to compare volumes of the same weight of sand in the other jars. This sample was placed in jar No. 1 in three approximately equal layers, each layer being rodded 30 times with a ¼-in. rod and the top of the sand leveled off. Another sample of dry sand was then placed, a scoopfull at a time, in jar No. 2. This jar then contained dry, loose sand, which accordingly occupied a slightly greater volume than the "dry, rodded" sand in jar No. 1.



	Dry Rodded	Dry Loose	Loose	Loose	Loose	Loose	Loose	Loose	Loose
% Water (by wgt.)	0	0	1	2½	5	7½	10	15	17½
% Bulking	0	8.5	18.2	30.3	41.8	35.2	33.9	26.6	0
% Loss per Cu. Ft.	0	7.8	15.5	23.2	29.3	26.0	25.3	21.0	0
Wgt. per Cu. Ft. Incl. water	115.0 lb.	106.0	98.3	90.5	85.5	91.5	94.6	104.5	136.0 lb.
Wgt. Dry Sand in 1 Cu. Ft.	115.0 lb.	106.0	97.3	88.4	81.4	85.1	86.0	90.9	115.0 lb.

All percentages based on Tube No. 1 - Dry, Rodded Sand.

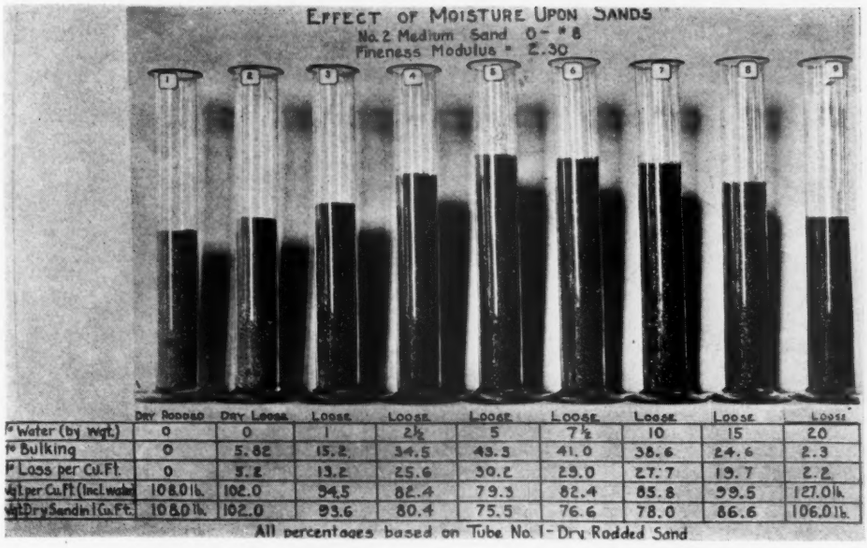
Fig. 1—Effect of moisture on sand having a fineness modulus of 2.65

Jars 3 to 8 inclusive were filled with samples of sand to which had been added 1, 2½, 5, 7½, 10 and 15% of moisture (by weight of dry sand). Jar No. 9 was filled with sand containing slightly more moisture than was required for saturation. This amount varied for the three grades of sand.

Referring to Figs. 1, 2 and 3, it will be noted that up to 5% of moisture the sands continued to increase in volume. This increase in volume amounted to 40% of the "dry, rodded" volume of the coarse sand and to 52% of the "dry, rodded" volume of the fine sand. Beyond this there was a gradual decrease until at saturation the volume was nearly the same as that in a "dry, rodded" condition.

In order that differences in volume might be distinctly evident, jars whose heights were several times their diameters were used. This resulted in a comparatively large glass area for the volume of sand, and as the sands became successively wetter, there was a greater tendency for the sand to stick to the glass and not settle as much as it would under conditions of field measurement. A comparison of the bulking, due to moisture as measured in these tests with that measured in containers recommended for field use, whose heights and diameters are approximately equal, shows the former to be approximately 10% higher.

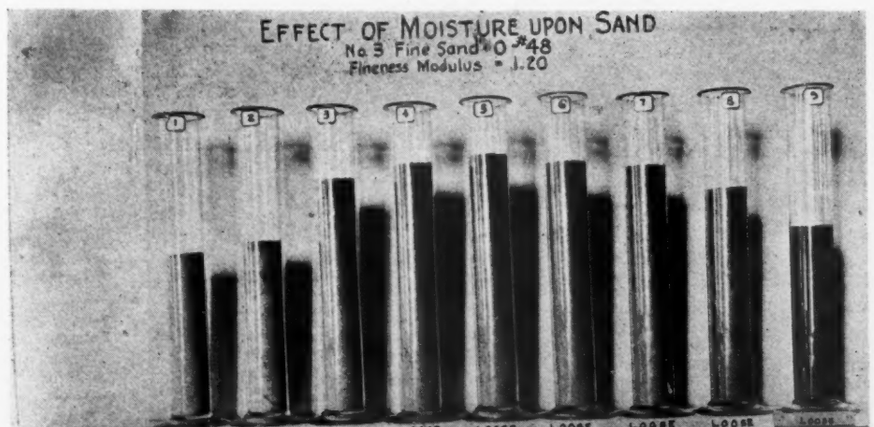
The important lesson to be gained from a study of Figs. 1, 2 and 3 is that the actual amount of sand in 1 cu. ft. of damp sand measured loose varies within wide limits Using the values from Fig. 1 for illustration, it will be seen that while 1 cu. ft. of sand in a "dry, rodded" condition weighs 115 lb., yet the weight of dry sand in 1 cu. ft. measured loose and containing 5% of moisture is but 81.4 lb. Thus 33.6 lb., or 29.3%, of the sand was lost by measuring it damp and loose. Field tests show that a moisture content of 5% in sand is quite common. Where proportions are expressed by volume, as 1:2:4, the actual amount of sand in a one bag batch may vary by 67.2 lb., depending on whether the sand is measured in a "dry,



	Dry Rodded	Dry Loose	Loose	Loose	Loose	Loose	Loose	Loose	Loose
% Water (by wgt.)	0	0	1	2½	5	7½	10	15	20
% Bulking	0	5.82	15.2	34.5	43.3	41.0	38.6	24.6	2.3
% Loss per Cu.Ft.	0	5.8	13.2	25.6	30.2	29.0	27.7	19.7	2.2
Wgt. per Cu.Ft (Incl. water)	108.0 lb.	102.0	94.5	82.4	79.3	82.4	85.8	99.5	127.0 lb.
Wgt. Dry Sand in 1 Cu.Ft.	108.0 lb.	102.0	93.6	80.4	75.5	76.6	78.0	86.6	106.0 lb.

All percentages based on Tube No. 1 - Dry Rodded Sand

Fig. 2—Effect of moisture on sand having a fineness modulus of 2.30



	Dry Rodded	Dry Loose	Loose	Loose	Loose	Loose	Loose	Loose	Loose
% Water (by wgt.)	0	0	1	2½	5	7½	10	15	2.5
% Bulking	0	5.35	41.8	50.4	52.5	47.1	43.1	27.8	1.07
% Loss per Cu.Ft.	0	5.0	29.4	33.5	34.4	32.0	30.1	21.6	1.0
Wgt. per Cu.Ft (Incl. Water)	102.0 lb.	96.9	72.7	69.5	70.2	74.6	78.4	91.9	126.4 lb.
Wgt. Dry Sand in 1 Cu.Ft.	102.0 lb.	96.9	72.0	67.8	66.9	69.4	71.3	79.9	101.0 lb.

All percentages based on Tube No. 1 - Dry, Rodded Sand

Fig. 3—Effect of moisture on sand having a fineness modulus of 1.20

rodded" condition or in a loose condition with a moisture content of 5%. While the volume of the coarse aggregate is not affectel noticeably by the moisture, it compacts from 7 to 15% upon rodding. A 1:2:4 mix, where the aggregates are measured "dry and rodded," in reality approximates a 1:1.4:3.6, where the aggregates containing 5% moisture are measured loose. It will be apparent that proportions very different from those intended will be used unless proper correction is made for the effect of moisture in the fine aggregate. The mix will be undersanded.

The correction for bulking in sand caused by moisture is easily made. As aggregates have standard volumes only when "dry, rodded," proportions should be used in which the volumes of the aggregates are given in a "dry, rodded" condition. It is then merely necessary to determine how much sand measured damp and loose is necessary to make 1 cu. ft. in a "dry, rodded" condition, and similarly for the coarse aggregate. These weights are determined on the job and the proportions revised to meet field conditions.

Because of the bulking of sand when damp, some prefer to use proportions by weight. Where such is the case it is obvious that the weight of aggregates should be determined in a "dry, rodded" condition in order that they may be standard. With proportions so expressed it is merely necessary to use enough additional sand and coarse aggregate to compensate for the weight of moisture contained. Simple tests made on the job will determine the weight of moisture present, which must be replaced by an equal weight of dry aggregate.

Another method, known as the inundation method, has been used to a limited extent to measure the fine aggregate in a concrete mixture. Sand is inundated when it is poured or shoveled into sufficient water to flood it. A simple experiment, illustrated in Fig. 4, in which the medium sand, graded from 0 to ⅛-in., in the jars in Fig. 2 was inundated, shows what happens. In the experiment all of the samples were inundated with just sufficient water to inundate the dry sample. The additional moisture in the wet samples was removed to a uniform height before the photograph was taken. Regardless of the bulking shown in Fig. 2, all samples, which it will be recalled contained the same weight of dry sand but varying amounts of moisture, have approximately the same volume when inundated. The bulking of sands due to moisture is therefore corrected automatically when measured in an inundated condition. Tests easily made will determine the relation between standard proportions in which the aggregates are measured "dry, rodded," and where the fine aggregate is measured inundated.

An article in a succeeding issue will discuss and illustrate in detail the three methods of proportioning water, cement, fine and coarse aggregates in a concrete mixture for a predetermined strength, using the aggregates damp and loose as found on the job.

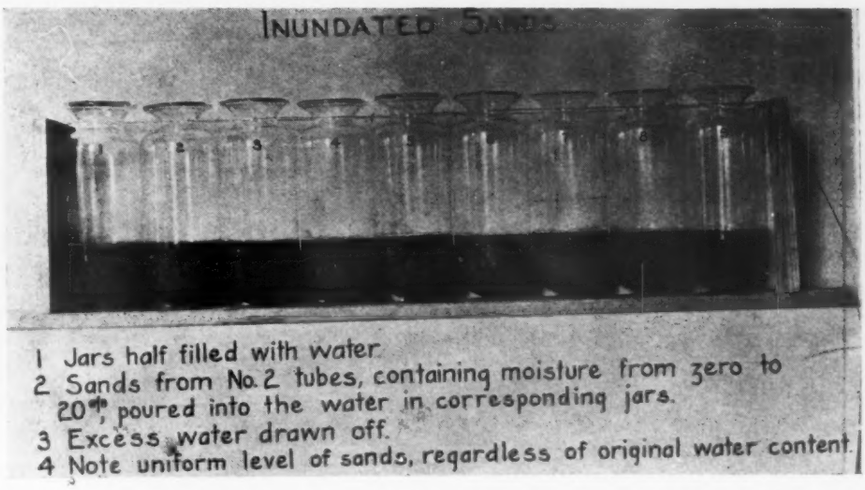

INUNDATED SAND
1 Jars half filled with water
2 Sands from No. 2 tubes, containing moisture from zero to 20%, poured into the water in corresponding jars.
3 Excess water drawn off.
4 Note uniform level of sands, regardless of original water content

Fig. 4—Showing effect of inundation on same sand shown in Fig. 2 above

The Gallagher plant of the Goodwin-Gallagher Sand and Gravel Co., Cow Bay, on the north shore of Long island, New similar view in Rock Products of March 31—Photo copyrigh

island, New York; the pit and plant at the extreme left (the Phoenix plant of the same company) was illustrated by a hoto copyrighted by Hamilton Maxwell, Inc., New York City

Five-mile aerial conveyor from gypsum quarry to mill—200 ft. spans

Diesel Engines as Prime Movers in a Gypsum Plant*

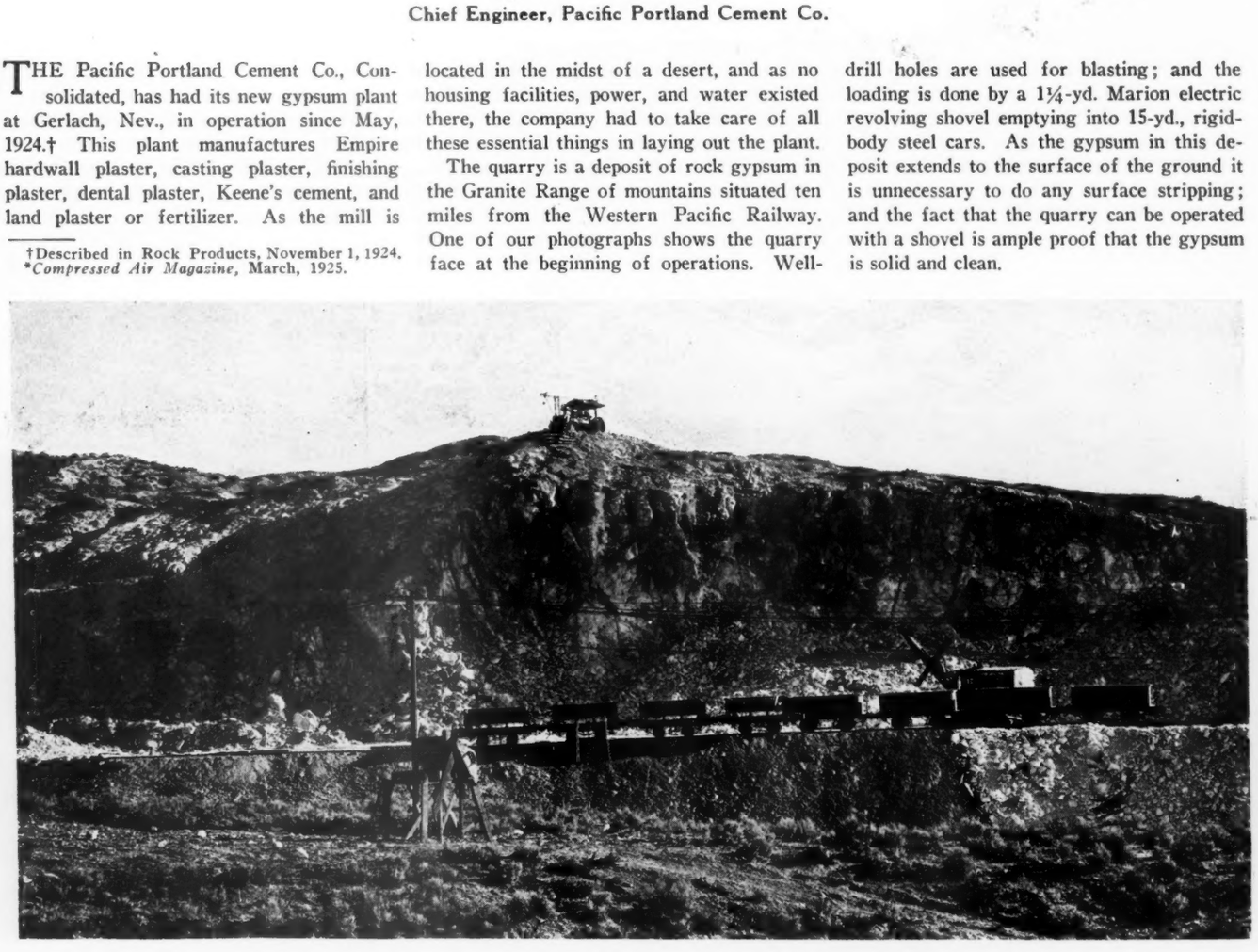
Pacific Portland Cement Company's Gerlach, Nevada, Gypsum Mill

By W. C. Stevenson
Chief Engineer, Pacific Portland Cement Co.

THE Pacific Portland Cement Co., Consolidated, has had its new gypsum plant at Gerlach, Nev., in operation since May, 1924.† This plant manufactures Empire hardwall plaster, casting plaster, finishing plaster, dental plaster, Keene's cement, and land plaster or fertilizer. As the mill is located in the midst of a desert, and as no housing facilities, power, and water existed there, the company had to take care of all these essential things in laying out the plant.

The quarry is a deposit of rock gypsum in the Granite Range of mountains situated ten miles from the Western Pacific Railway. One of our photographs shows the quarry face at the beginning of operations. Well-drill holes are used for blasting; and the loading is done by a 1¼-yd. Marion electric revolving shovel emptying into 15-yd., rigid-body steel cars. As the gypsum in this deposit extends to the surface of the ground it is unnecessary to do any surface stripping; and the fact that the quarry can be operated with a shovel is ample proof that the gypsum is solid and clean.

†Described in Rock Products, November 1, 1924.
Compressed Air Magazine, March, 1925.

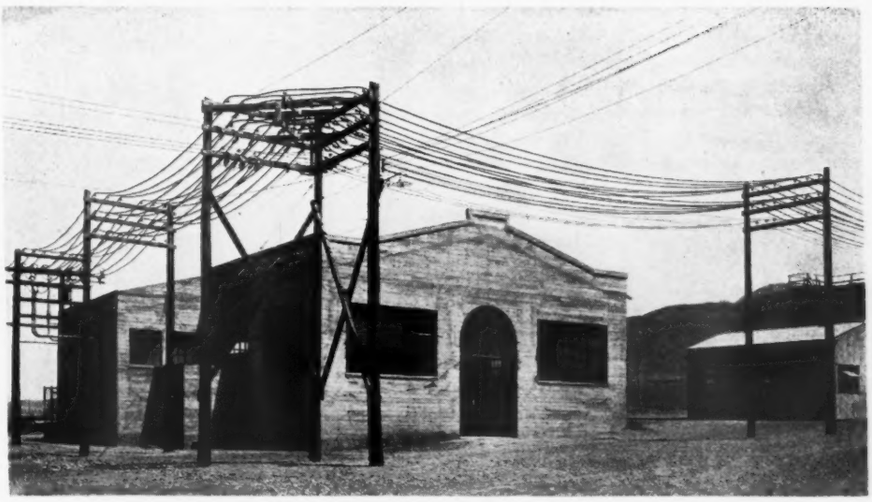


A mountain of gypsum rock, well-drilled, and loaded with electric shovel

Crushing plant and aerial tramway loading station for gypsum rock

The crushing plant is located directly below the quarry so that the cars, drawn by a 6-ton Plymouth gasoline locomotive, can dump their loads by means of a rotary car dumper directly into the crusher feed bin. The crusher feed is regulated by a Sheridan grizzly-type feeder; and the rock is crushed in one operation by a Jumbo Williams mill to a size of ¾-in. and under. The material is then conveyed by belt into a concrete, silo-type, tram-loading bin. In this type of bin the buckets follow around the bin, which has numerous loading gates. In short, the tram track is laid in a circle. Compressed air is used at the quarry to operate the car dumper as well as the gates that permit feeding gypsum into the tram buckets.

For the purpose of carrying the material from the crusher to the mill, there has been provided a 5-mile aerial conveyor of the Trenton-Bleichert type. Its 17-cu.-ft. buckets ride on a 1⅜-in. lock coil cable that is supported by a succession of wooden towers. An accompanying illustration shows one of these spans which is over 200 ft. from center to center of the towers. This conveyor was furnished by the American Steel & Wire Co.



Reinforced-concrete substation for quarry and crushing plant operation

In the plaster mill all grinding is done in one operation by Raymond mills; and the ordinary brick-lined pot kettle is used for calcining. The grinding-mill bins are so arranged that raw crushed gypsum can be discharged from them directly into cars for

Gypsum plant at Gerlach, Nev.; aerial tramway terminal at the right

A street in Gerlach showing employes' homes erected by the company

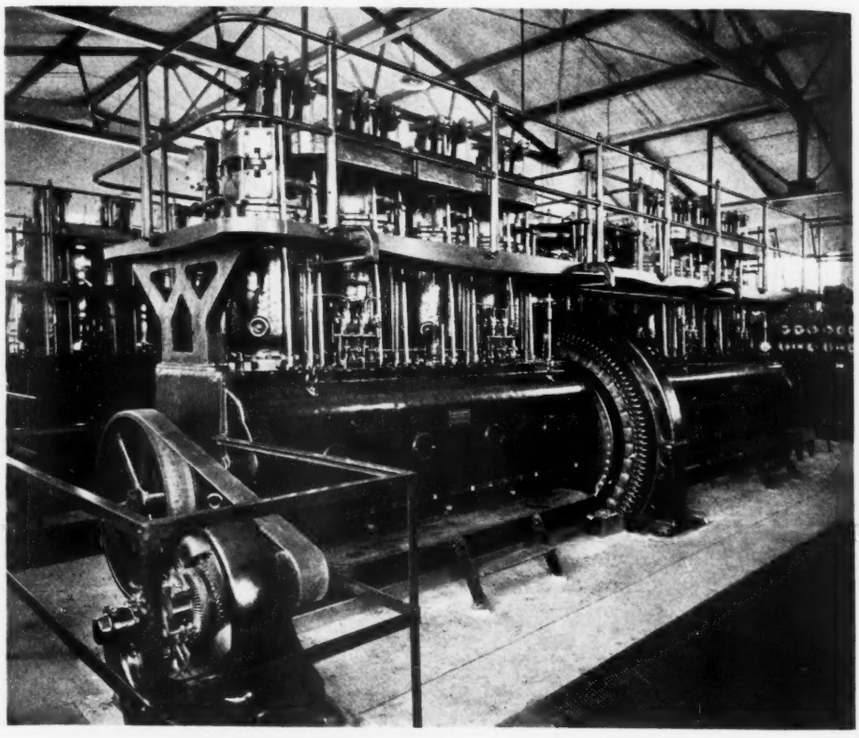
shipment, while ground gypsum can be loaded into waiting cars right from the kettle bins. Furthermore, railroad cars can be run in between the grinding room and the kettle room to facilitate shipping raw gypsum either in a crushed or a pulverized state.

Unusual Feature—Storage for Calcined Gypsum

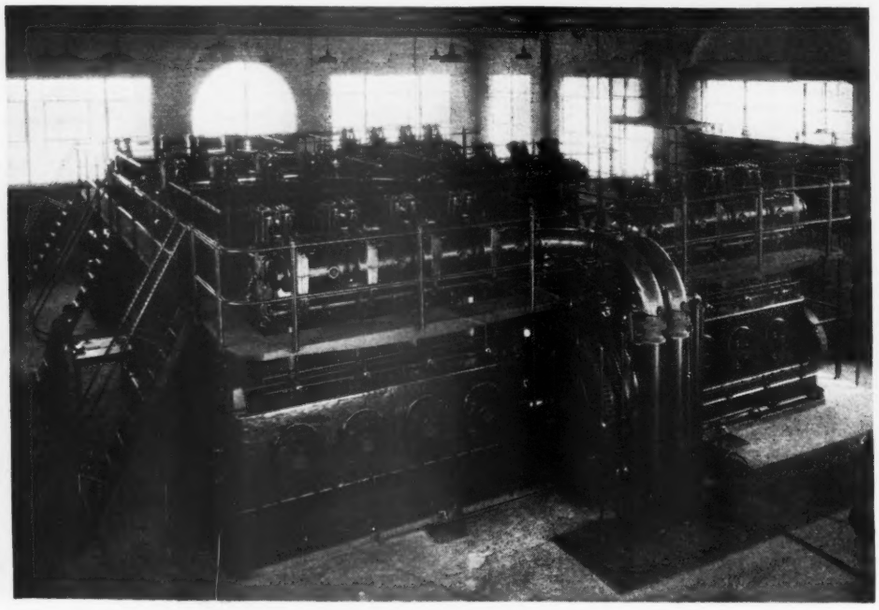
Because of the geographical location of the plant it has been necessary to furnish storage space for the finished material, and to this end eight concrete silo-type bins were erected. Loading at this point is done under cover so as to protect the finished product against the weather. As sacks are an important item in a plant of this kind a storage house has been provided for them that is also equipped with suitable facilities for their repair. All bins, except the silo-type storage bins, are made of steel, are circular, and have conical bottoms which slope at an angle of 60 degrees above the horizontal. A bottom of this kind causes the entire contents of a bin to flow from it freely.

Direct-Connected Motor Drives Throughout

As far as practicable, all units in the mill are direct connected and individually driven. Spur-gear speed transformers, manufactured by Foote Brothers Gear & Machine Co., make this individual drive possible and likewise assure economy in space requirements. The vital matter of safety-first has been carefully considered and provided for. All running parts are guarded; and large platforms, with hand railings, make inspection and repair easy and free from hazard. Fuel oil is used in the kettles and is atomized by means of air at two lb. pressure—a rotary compressor furnishing the air. Compressed air is also utilized in the mill and the machine shop for pumping oil by means of displacement pumps, for aerating material, and for other general services.



One of three 8-cylinder 800-h.p. Diesel engines



Another view of 800-h.p. Diesel engine and generating unit

800-h.p. Diesel Engines

All machinery about the mill is driven by 440-v., 3-phase, electric motors; and the power required throughout the plant is generated by means of three 8-cylinder, 800-h.p. Ingersoll-Rand, solid-injection, Diesel engines, each connected to an electric generator. These engines use heavy fuel oil; and they have made good every guaranty given by the Ingersoll-Rand Co. in the specifications. As the climate in the region covers a wide range of temperatures—from 40 deg. F. below zero in the winter to 115 deg. above zero in the summertime—open-air construction was used the better to radiate heat from the conductors.

The Pacific Portland Cement Co., Consolidated, also operates a plaster mill at Plaster City, Calif., and two portland cement plants: one at Cement and the other at Redwood City, Calif.

An Editor's Observations at Columbus and Philadelphia

Season Opening with Every Prospect of as Good or Better a Year Than 1924

By Edmund Shaw
Editor, Rock Products

ON HIS WAY EAST, the writer stopped for two days at Columbus, Ohio, and talked with some of the producers of rock products. Everyone seemed to think the outlook for the coming season was cheerful. At the office of the Marble Cliffs Quarry Co., the feeling was that the coming season would at least equal that just past. The rotary kiln lime plant of the company which was put into production a little over a year ago, is functioning steadily and Russell Rarey said that there seemed to be nothing about it which they would change, since it was capable of producing its anticipated output from the start.

This company produces a large amount of road material and the district about Columbus uses more crushed stone than some other areas of equal population for so many of the local roads are of the bituminous macadam type. A regular system of converting old macadam roads to the newer type has been developed there, "wedge" courses being laid at the sides to flatten the crown before putting on a bituminous top. Engineers from Canada and many parts of the United States visit Columbus to study the system of road building employed.

The only producer's plant that was visited was that of the Island Sand and Gravel Co. A large tonnage of stored material, which had been accumulated during the winter months was noted, but Mr. Murphy, the sales manager of the company, said that there was none too much, and that it would go fast as soon as warm weather came.

Neal Halleck of the Halleck Sand Co. was at Chillicothe where one of the company's plants is being reconstructed. A Sauerman dragline outfit is being installed in place of a steam shovel and cars. It is somewhat unusual to find such a change of methods, but the dragline is much cheaper for the tonnage that is wanted. The Arrow Sand and Gravel Co. installed a Bucyrus dragline excavator about a year ago, in order to increase output, and is very busy with the season's orders.

The Cunard-Lang Concrete Block Co.'s plant was visited, and this is an especially interesting plant as it has been in business for 17 years, about as long as concrete blocks have been made on any sizeable scale. Of course the plant has been remodeled and improved a number of times in that period, larger machines of newer design being added and material handling equipment introduced in order to keep pace with both the demand for blocks and developments in the art of making them. Besser machines are now used, two of them turning out 4500 block per day, winter and summer. There is an excellent system of handling the aggregate which is received in hopper-bottom cars, dumped in a track hopper and elevated to a screw conveyor which sends it to the bins. A bucket on a monorail beneath the bins takes the aggregate to the mixers. Blocks are handled through the kilns and into the yard by a series of parallel tracks and a transfer truck.

Washed limestone from ½-in. to ¼-in. in size is used as a coarse aggregate. This is furnished by the Marble Cliffs Quarry

Plant of the Island Sand and Gravel Co., Columbus, Ohio

Plant of the Cunard-Lang Concrete Block Co., Columbus, Ohio

Co., which washes all its finer sizes of stone. River sand is used as fine aggregate and lake sand for facing blocks.

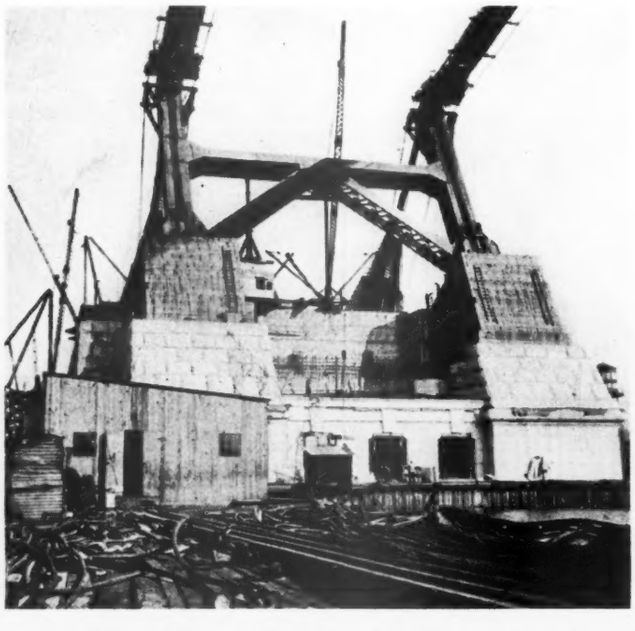
Regulating Producers!

From Columbus the writer went to Philadelphia where the committee meetings of the American Society of Testing Materials were in progress. The Philadelphia newspapers mentioned that such meetings were being held to the extent of perhaps a quarter of a column, which probably was passed over by 90% of the newspaper readers. It strikes one as a curious development of our industrial civilization that even well informed people do not appreciate the importance of the work of such societies as this. In fact most people never even heard its name. Yet its deliberations affect us in a business way more than much of the legislation passed by Congress and state legislatures.

All portland cement, for example, is bought and sold on A. S. T. M. specifications. Where the specifications are not wholly adopted in the purchase of other materials they are used as a basis from which to write specifications to suit local conditions. A good example of this found in the specifications for highway materials written by the highway commissions of various states. Most of these are based on the A. S. T. M. specifications but modified to suit the needs of the locality.

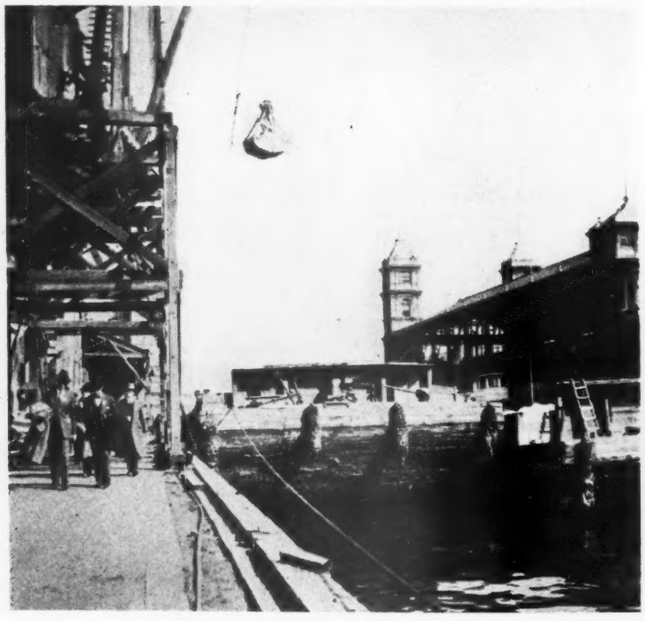
In company with the members of the society the writer visited the Delaware river bridge, interesting to everyone as the longest clear span yet built, but interesting to Rock Products readers because it is a very sizeable concrete job. Although it is a steel bridge about 320,000 yd. of concrete has gone into its construction which gives some idea of the part the rock products industry plays in all sorts of construction. An immense amount of concrete must be added to this for the construction of the approaches, which are built on reinforced concrete piles in some places. Piles were being driven when the bridge was visited and they seemed to be handled and driven about as easily as wooden piles, and with as little danger of breaking.

The aggregate for this job is sand and gravel from local producers, most of it com-



Camden anchorage of the new Delaware River bridge

Delaware River bridge as it looked on March 27



Unloading sand and gravel barges at Delaware River bridge

Concrete piles in approach to Delaware River bridge

ing from Tullytown, Penn., near Trenton, N. J. All the gravel is 1½-in. and finer. There were almost no rejections of aggregate, although every shipment was very carefully inspected.

The concrete products business in and around Philadelphia is reported to be booming, with the production of practically every plant oversold for the season. Concrete brick as well as concrete block are made here in large quantities. The largest of the Philadelphia plants, that of the Pennsylvania Brick and Tile Co., was described in Rock Products in the issue of May 3, 1924.

Sand, cinders and slag are the aggregates used, although at least one producer says that he would prefer to use stone screenings if he could get them at a reasonable price.

Developments at the South Dakota State Cement Plant

THE state cement plant at Rapid City is to have the services for an indefinite period of Senator Verne C. Kennedy of Canton, S. D., as consulting engineer, it became known last night, following a conference between Senator Kennedy and Governor Carl Gunderson.

Senator Kennedy will arrive in Rapid City today and will begin work Monday as consulting engineer for the plant. He is a consulting engineer by profession and a graduate of Massachusetts Institute of Technology and he was a leading figure in the recent legislative cement plant investigation in which he handled technical phases of the inquiry as a senate member of the committee. Mr. Kennedy, who is serving his first term in the senate from Lincoln county, will not resign from the senate to assume his new work, although it was indicated that he expects to spend some months at least at the plant supervising production and necessary repairs. —*Sioux Falls (S. D.) Argus- Leader* February 28, 1925.

* * * *

Bill Compelling State to Use Cement Defeated

Men connected with the operation of the $2,000,000 state-owned cement manufacturing plan at Rapid City, upon whom devolves the duty of operating the plant so it will pay a profit to the state, express disappointment over the defeat by the recent session of the legislature of a bill which would have compelled the use of state cement in any public works in South Dakota paid for by taxation, subject only to exemption by the state engineer.

Manager Gives Views

While the extreme pessimism of others is not shared by Paul Bellamy, manager of the plant, he does admit that a very difficult problem has been raised by refusal of the legislature to pass the bill.

"When first drawn," he said, "the bill was dangerous, for it would have permitted outside firms to set the price which the state plant would have had to meet, regardless of cost of production. But that was merely because it was drawn hurriedly to get in before the closing date of introduction of bills. As finally presented, passed in the senate but defeated in the house, the bill would have required public construction to have used state cement, provided the state desired to supply it, with exemption if permission was granted by the state engineer.

Creates Problem

"The extent of the problem this creates may be illustrated by considering the situation at Kennebec, where there are two bidders on the new courthouse to be constructed there. If the bill had gone through we would not have the expense of 'selling' both contractors on the idea of using state-manufactured cement, as we now must do, with the possibility, of course, that we may not sell. That same situation arises in every instance of public works."

Mr. Bellamy reaffirmed the state cement commission's policy to sell the state-manufactured cement through dealers, and declared that while he was in charge as manager of the state-owned plant he would vigorously push this policy.—*Sioux Falls Argus-Leader,* March 11, 1925.

Senator Consulting Engineer Tenders Resignation

State Senator Verne C. Kennedy, consulting engineer at the state cement plant, has tendered his resignation on the grounds the conditions are not satisfactory at the plant.—*Sioux Fall Argus-Leader,* March 12, 1925.

* * * *

The state cement plant at Rapid City is one of the best in the United States according to William A. Ernst, chief chemist of the plant. The plant is one of the most modern and the product is from 25 to 50% above the standard required by the American Society for Testing Materials.

Mr. Ernst has been in the city explaining and describing the state plant to the lumber dealers gathered in convention here—*Sioux Falls Argus-Leader,* March 13, 1925.

* * * *

Senator Kennedy Depreciates Politics

"That interview which appeared first in the *Rapid City Journal* and which was reprinted in *The Press* was never authorized by me," said Senator Verne Kennedy, of Canton, who was in the city yesterday on business. "I'm not saying that there were any mis-statements in the interview but I did insist at the time that the least said about my whole connection with the cement plant, the better for it," he continued.

It will be remembered that Senator Kennedy went to Rapid City ostensibly as consulting engineer and after being there but a short time, wired his resignation to Governor Gunderson.

"I still believe that there has been too much said about the affair," he stated, "but I am so desperately interested in trying to save something out of the situation for the state that I am deeply concerned over it all. I have been placed in a very embarrassing position. God knows I did not want the job as general manager of the plant. It was because of their importunity that I finally consented to go to Rapid City under the title of consulting engineer and await the pleasure of the governor and the commission to announce that I was to be placed in charge of the plant. Plenty of people knew all about the arrangement, and my reluctance to accept the offer. I have only one thought in mind, and that is the good of the state. I am very sorry that the interview which was published conveyed the idea that I was sore and disappointed. I have no hard feelings toward the governor or any one else. In fact, I am frankly glad to be out of it all. But the cement proposition is such a large one that it appealed to my imagination and this was the compelling factor which made me consent to take charge of it. It is to be hoped that I have been of some use to the commission in the reports which I have filed with the governor and in connection with the investigations by the committee of which I was a member.

"If Politics Can Be Kept Out"

"I am convinced that under proper management, cement of high quality can be produced for less money at Rapid City than at any other place in the world and if politics can be kept out of it, I can see no reason why the state should not succeed with the plant. It is to be regretted that the bill requiring the cement to be used in all public work did not pass. That would have greatly decreased selling costs for the reason that all dealers would have felt the necessity for stocking state cement and they would have been averse to stocking two brands on account of the confusion which would have resulted."—*Sioux Falls (S. D.) Press,* March 20, 1925.

Vermont Plant for Making Terrazzo Chips

Development of a Marble Deposit Claimed to Be Exact Duplicate of Famous Italian Botticino

DURING the winter of 1925, E. C. Rockwell of New York City, and E. A. Bellmore of Brandon, Vermont, while prospecting for a marble deposit located an almost unlimited quantity of yellow tone marble near Brandon, Vermont. When the samples were analyzed and polished it was found that they were exact duplicates of the famous Italian Botticino marble. Experts said, however, that the texture of the Brandon deposit was better for polishing and for terrazzo than the imported.

These two men then organized the Brandon Rock Products Corporation to open a quarry and sell American Botticino. There are two hills of this marble. One of these was regarded as a "shattered" ledge, so on this ledge the plant has been erected to produce American Botticino, marble chips, for stucco dash, terrazzo, roofiing, chicken grit, etc.

This hill is about 50 ft. higher than the surrounding ground. The face of the quarry is now about 30 ft. high and is getting higher as they work back into the hill. The ledge is "tightening" up as they get down so it is quite probable that dimension marble may be recovered from this ledge as well as from the other hill, which has not been touched yet.

It is proposed to core drill the other hill before any blasting is done; for if the other hill is sound it will be opened as a dimension quarry and the waste only used for crushing.

So far the new plan is reported as not able to keep up with its orders. The present plant has a capacity of 100 tons a day, but it is going to be enlarged this spring and shortly the Brandon Rock Products Corporation expects to be able to fill all orders without delay.

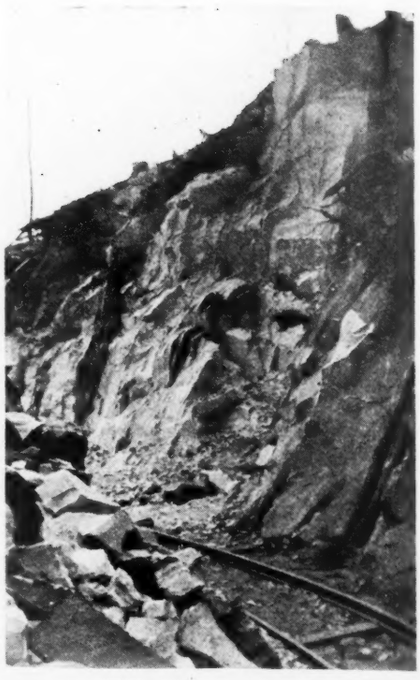
The property also contains several veins of coal pink, a nice soft pink, mixed with green. This has found a ready sale, too, with the stucco, terrazzo and cast-stone trade.

The operating equipment is as follows: A Clayton air compressor and receiver driving five Ingersoll-Rand Jackhamer drills. After the blast the stone is sledged and loaded into industrial scoop cars to bring the rock to the first crusher.

A jaw crusher receives the "one man" stone from the quarry. From this jaw crusher the rock is delivered by a Robins conveying belt to a Kennedy ball-bearing gearless gyratory crusher. From this gyratory the stone is taken by a bucket elevator 50 ft. to a set of Kennedy pulsating screens. These screens size the material and send the proper sized stone to their bins for bagging. The over-size is returned by a carrying tube to a set of Sturtevant crushing rolls which reduce it and return the re-crushed stone to the bucket elevator to again pass over the pulsating screen. There are four storage bins located directly under the pulsating screens. Each bin with a capacity of one carload.

Beneath the bins is the bagging room. The finished material is packed in 100-lb. burlap bags and is then ready for shipment.

The entire plant has General Electric Co. equipment, with separate motor for



Quarry of the Brandon Rock Products Co.

Another view of quarry face

Crushing and screening plant of the Brandon Rock Products Co.

each unit. The Hortonia Power Co. supplies the high tension current and it is metered to the Brandon Rock Products Corporation private line and transformed to 220 v. for power and 110 v. for lighting.

The terazzo and stucco sizes comprise the bulk of the company's present output, but orders have been received for chicken grit, facings for cement blocks, aggregate for cast stone and the dust is approved as agricultural lime by the New York State Experimental Station at Geneva, N. Y.

The plant is located two miles from Brandon, the shipping station, but as there is a state road all the way, except for about 2,000 ft. into the property, the trucking problem is very simple.

The officers expected to close down for the winter months but orders kept coming in so they have been forced to run all winter. The snow has decreased production slightly. Now that spring is here the mill will soon be running to capacity again as orders are piling up. April deliveries are all spoken for and May and June deliveries are rapidly being booked.

The officers of the corporation are: President, Wm. Rockwell, Brandon, Vermont; vice-president, E. C. Rockwell, New York City; secretary and treasurer, E. A. Bellmore, Brandon; general counsel, Frank W. Williams, Brandon.

Side elevation of crushing and screening plant

General view of the quarry and crushing plant of the Brandon Rock Products Co., near Brandon, Vt.

Greenville Gravel Company to Build Plant at Columbus, Ohio

ACCORDING to the *Greenville (Ohio) Advocate*, the Greenville Gravel Co. has secured 200 acres of gravel land within the corporate limits of Columbus, Ohio, where it expects to erect immediately a large washing and screening sand and gravel plant.

F. D. Coppock is president and general manager and J. F. Coppock general superintendent of the company.

More State Cement Plant Politics

ACTION aimed at Senator Michael Boylan's "cement plant" committee was taken by Farmer-Labor members of the Minnesota legislature.

A resolution asking that the committee, appointed and given $10,000 to make a survey of the feasibility of a state-owned cement plant at the last legislative session, be ordered to report its findings, was introduced by Senators Henry Arens, Nels A. Pederson and K. K. Solberg.

Senator Boylan said that the committee had made extensive investigations and would have a report ready before the end of the present legislative session.

The resolution was referred to the rules committee.—*St. Paul (Minn.) News.*

New Brunswick Lime Producers Combine

ALL the lime plants and properties of the Stetson, Cutler Co. of St. John, New Brunswick, have been purchased by the Fraser Companies, Ltd., with head offices at Fredericton. This addition increases the holdings of the company by about one-third.

The Stetson, Cutler Co. had several lime producing plants in Pokiok, a suburb of St. John, and a number of plants along the Bay of Chaleur and the Restigouche and Nepisiguit rivers.

The Fraser company's plants are at Plaster Rock on the Tobique river and at Edmundston on the upper St. John river. These plants have been enlarged and considerable new equipment added in recent years, particularly those on the Tobique.

The affiliated companies are now headed by Archibald Fraser, president, and Donald Fraser, Jr., vice-president. Most of the lime is shipped by schooner to the United States, as the plants have good water transportation facilities. Little of the product is freighted owing to the fact that these plants are rather distant from the railroads, making long hauling by wagon necessary.

Teaching Safety to New Employes

AN illustrated safe practice pamphlet dealing with "Teaching Safety to New Employes," has just been published by the National Safety Council. The pamphlet is non-technical in reading matter and is the combined experienced of the industrial members of the council. It is edited by 75 safety engineers who form a volunteer committee for such work.

"One of the most important considerations of industrial management is the introduction of the new employes into the plant," reads the introduction. Statistics show that the new employe is more liable to injury than one who has seen long service.

"Accidents to new employes are due not so much to carelessness or thoughtlessness as to lack of familiarity with the hazards and working conditions. Another factor is nervousness due to a desire to equal the production or speed of the more experienced workmen. Mechanical safeguards in specific industries may, to a certain extent, prevent accidents from both of these causes. The greater number of accidents however, occur from causes that are not preventable by guards. Education and supervision are the only effective methods of attack for such accidents.

"This makes it very important that special care be taken to teach the beginner. The experience of the National Safety Council shows that it is advisable to reach the new man just as soon after his employment as possible."

Inquiries regarding this pamphlet should be addressed to the National Safety Council, 168 North Michigan avenue, Chicago.

Hints and Helps for Superintendents

Blacksmiths and Drill Steel at Quarry Plants

By F. J. MacDONALD
Cobleskill, N. Y.

IT IS SAID that history repeats itself; good blacksmiths are nearly as scarce now as in biblical days. Since the coming of the automobile craze there are few if any young men learning the blacksmith trade as the work is rather hard and strenuous, and most people nowadays are not looking for hard work.

Automobile repairing seems to be the order of the day. Must old Dobbin or Ned go bare foot for the sake of a smith? Some of the handy farmers have solved the problem by buying a forge and tools and doing their own horse-shoeing.

All cannot do that and the blacksmith problem has reached serious proportions in some sections. The smith has always held an important place in our nation's progress and in many cases exhibited wonderful skill.

He was expected to make anything from iron or steel. He followed the pioneer and early settlers to forge their plow shares, and their axes to hew down the forest trees. With many great skill was attained. I have heard of a man in this town (several years ago) that successfully welded a cross-cut saw, and the job was so wonderfully done that the weld could hardly be discovered and the saw's usefulness was unimpaired.

Perhaps I have given history enough. During the rush of quarry operations of 10 hours per day (and as I have said 10 days per week) a little recreation and thoughts along other lines are enjoyed by the most of us—even if read in Rock Products.

It has been my privilege to work with some wonderfully good smiths. One old man in particular that spent a lifetime at the business. He was employed at a quarry and of course the drill sharpening work required his particular attention. After a time he acquired a skill rarely attained by most of us. He could successfully forge weld hollow steels and retain the hole or hollow unimpaired. Such a procedure is not to commend but the drill's usefulness was prolonged with a fair degree of success; and he proved himself a good craftsman in doing the trick. It should be known that the oxy-acetylene weld is worthless for such work. The electric weld is employed successfully.

Some quarry men insert an ad, "Wanted a Blacksmith." They do not specify a quarry blacksmith or drill sharpener. A smith is employed and is supposed to know everything. I have in mind a foreigner that was employed for such work. He was a skillful forger. The hammer marks were so completely obliterated in his finished product that they were better than the average smith with all his filing and finishing. As a drill sharpener he was a complete failure. Spoiled in tempering every drill on the job.

In this short article I will not attempt to tell every one how to sharpen drills, for if I did I would surely expose my ignorance. Different conditions require different ways and methods of procedure. Here again the idea of cheapness or economy creeps in to impair the finished product.

Some superintendents or companies have told the smith that he will have to use soft coal. The skillful smith should refuse to use it absolutely, as he well knows that the gas and sulphur in soft coal very much impair the steel. We all wish to economize. Economy at a loss is of no avail.

Some try to save a few cents in the purchase of an inferior drill steel and expect the wonderful smith to make it good. The best steel is none too good and is the cheapest in the long run and means economy in the end.

Perhaps the approximate cost of hand sharpening a small "air-gun" drill is around 20 to 25 cents. (An outsider would consider himself fortunate if he could get it done for that.) The difference in cost of sharpening a dozen drills twice each or four times means a difference of $5 to $6. Many do not look at it in this light and perhaps give the cheap smith the preference.

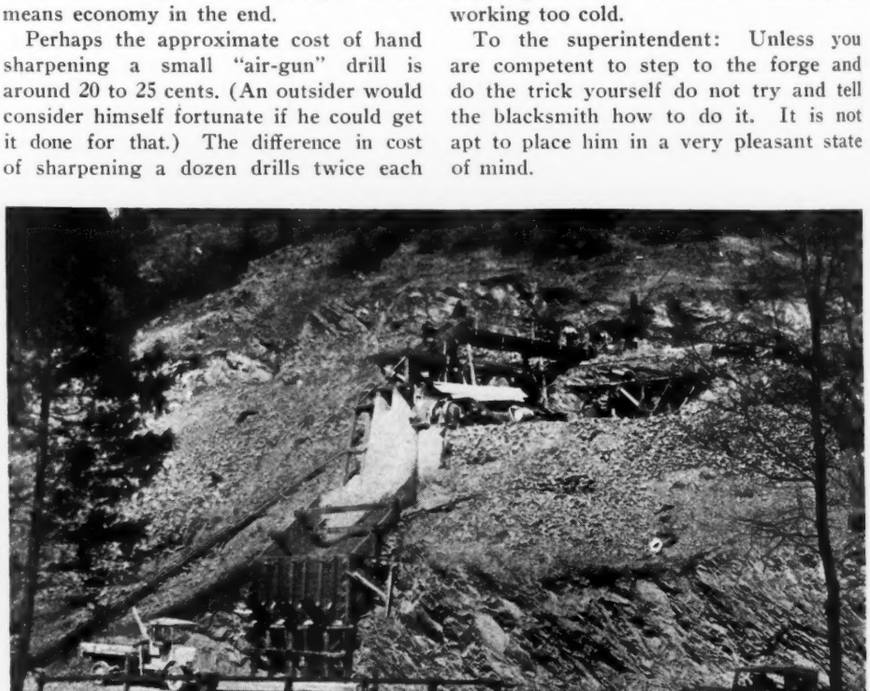
If you are fortunate enough to have a good drill sharpener it is best to stick to him if possible; even if his wage does seem to be rather prohibitive, perhaps it will be cheaper in the end than another long experiment. The tramp smith sometimes shows remarkable skill and his downfall is usually attributed to intemperance.

I visited the shop of the boozer type of smith (one time) and the poor equipment was surprising. The old bellows leaked. An old horizontal drill was used, and just as few tools as possible were used. Yet this man did remarkably good work. What a grand success would have followed with a good equipment and a sober man!

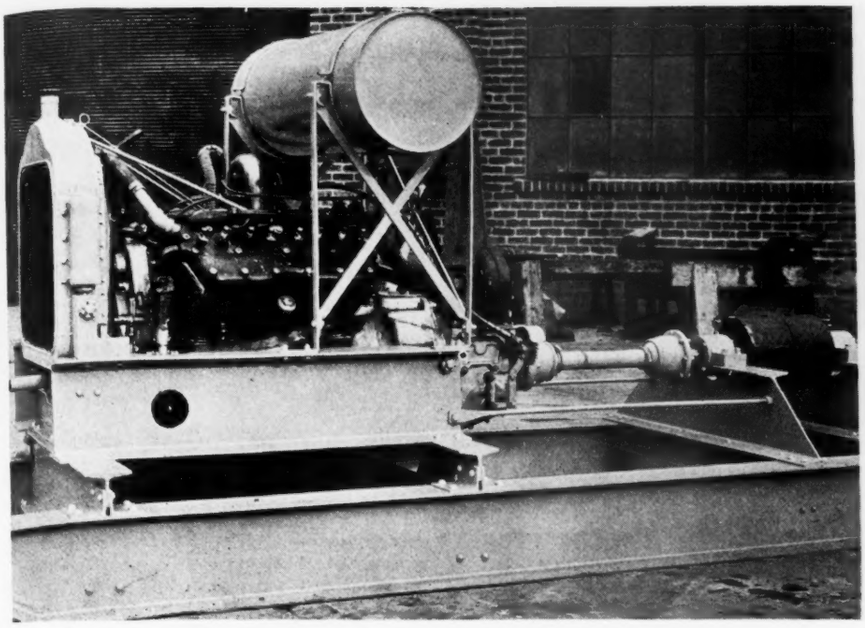
A few more words about drills. For large plants where conditions warrant, the power or machine sharpener is very effective as a time and labor-saving device. The reasonably skillful smith, with good instructions (furnished by drill and "air-gun" makers—not a correspondence school), and a reasonable amount of experimenting, will come out successful to a marked degree.

The oil dip before the water or chemical dip is very effective in preventing the cracking of bits. Avoid overheating or working too cold.

To the superintendent: Unless you are competent to step to the forge and do the trick yourself do not try and tell the blacksmith how to do it. It is not apt to place him in a very pleasant state of mind.



California crushing plant using a rebuilt automobile engine for power



Rebuilt automobile engine for driving small crushing plant

Motor Truck Engines for Driving Rock Crushers

CADILLAC automobile engines, acquired by the government for war purposes, are now being used to crush rock for highway construction in California. This practical adaptation of surplus war material has been made possible by the rebuilding of the automobile engines in the headquarters shops of the California Highway Commission at Sacramento.

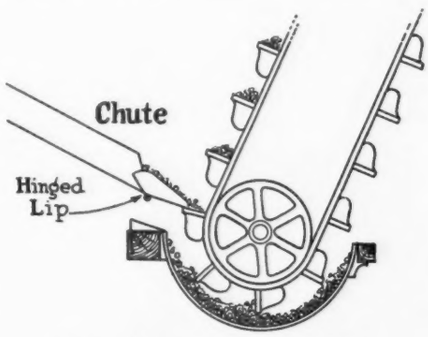
Four power plants, using eight-cylinder Cadillac motors, are now in service in the Sacramento canyon, driving rock crushers for the production of road surfacing material.

Recently a carload of Cadillac motors, radiators and spare parts were obtained from the government stock at the Rock Island arsenal.

By the use of these materials the highway commission's shops are able to turn out a very satisfactory power plant at an expense of $550 per plant, including freight from the government arsenal.

Protecting Bucket Elevators

MANY operators using bucket elevators have probably had trouble with the elevator bucket catching on the end of the chute feeding the material. This is usually due to no fault of the bucket itself, but on account of the horizontal wobble when the elevator is heavily loaded. The J. L. Shiely Co., of St. Paul, Minn., remedied this difficulty in a very simple and effective manner. The edge of the chute feeding on to the elevator was hinged about 6-in. back, consequently when the elevator bucket caught on the end of the chute instead of damaging the bucket the hinged end merely lifted slightly and dropped back in place. In using this idea, one must be careful not



Hinged lip on chute prevents nicking buckets

to place the hinge too far back from the edge of the chute, as it might then catch on the higher bucket.

Old Freight Cars for Warehouses

DURING a recent visit to plants in and near Indianapolis, Ind., one of ROCK PRODUCT'S editors saw old freight car bodies used as warehouses at two or three plants. On inquiry he was told that they were bought from the railroads for a merely nominal sum and that otherwise the car bodies would have been broken up and sold as scrap lumber.

The trucks and iron work are of value and are retained by the railroad. The railroad also collects freight on the car bodies to the point of installation.

The photograph shown was taken at the plant of the Atlas Sand & Gravel Co. in Indianapolis. There are three old car bodies in use as warehouses there. A very little repairing sufficed to make them weather-proof and shelves on the inside made them excellent storage houses. They are set up from the ground to keep the dampness from affecting the sills of the car.

Cheap warehouses for sand and gravel plant

Cut Off Used with Gravity Screens

GRAVITY screens are used for both sand and gravel at the plant of the Eaton-Kaster Gravel Co., Indianapolis, Ind. At times the flow of one of the products has to be changed from a bin to a screen where it is further separated.

The change is made by having a sliding bottom in a chute. When the material is to flow one way it flows over this bottom and when it is to flow the other, the removable portion is drawn out so that the material drops through the chute and into another chute below.

The picture shows the bottom boards drawn out to allow the material to fall through the chute. When the flow is to be changed the boards are pushed back until the cleat shown on the end touches the side of the "screen house" in which the screens are placed.

A number of other interesting details of this plant will be found described on pages 55-77 of this issue.

Cut-off used with gravity screens

Financial News and Comment

Atlas Cement Plans Change in Capitalization

DIRECTORS of the Atlas Portland Cement Co. have approved a change in the company's capitalization which will consist of trebling the outstanding capital stock, changing the present par value from $100 to no par value, and providing for the exchange of three new shares for each share of common stock now outstanding. Stockholders will meet on May 6 to approve the changes.

At the same time the directors propose that the authorized preferred stock of the company be reduced from $3,000,000 to $2,500,000 by canceling $500,000 of unissued treasury stock and changing the preferred stock of the company from $100 par value into shares of $33.33⅓ par value, and exchanging three shares of this preferred stock for each shares of preferred now outstanding. It was stated yesterday by John R. Morron, President of the company, that this would not in any way alter the preferential right of the preferred stock to cumulative dividends at the present rate, or the total par value of the holdings of any preferred stockholder. Directors also have asked the authority to increase the common shares by 100,000.

After the proposed changes have been put into effect, the corporation's total capitalization will consist of 75,000 shares of preferred stock of $33.33 1-3 each par value, and 1,000,000 shares of common stock, without par value. It is understood that the dividend rate on the new shares will be comparable with that now paid on the present issue of 300,000 shares of $100 par value each. Common shareholders have received between 4 and 6% each year for several years, with extras in form of stock dividends.

Dolese and Shepard Company Reduce Capital Stock

THE stockholders of the Dolese & Shepard Co., crushed stone quarry operators, Chicago, Ill., have voted to reduce the capital stock from $2,000,000 to $1,000,000 by changing the par value from $100 to $50. By this action a deficit of $840,559 is wiped out and a surplus of $159,441 created. Net earnings for 1924, after charges, were $180,873. A dividend of $1.50 was declared, being the first payment since 1908.

Wolverine Cement Profits Double

WOLVERINE PORTLAND CEMENT Co. made net profits of $225,659 in 1924, which is equal to about $2.26 a share on the $1,000,000 capital stock of $10 par value and compares with profits of $111,853 in 1923, equivalent to $1.12 a share. Surplus balance at the end of last year, after payment of dividends and income tax, was $208,367. — *Michigan Manufacturing and Financial Record.*

Wolverine Cement Earnings

INCOME and Profit and Loss Statement for Year Ended Dec. 31, 1924.

Net sales, $1,129,891; cost of goods sold, $828,659; gross profit	$301,232
Selling expenses, $28,399; administrative expenses, $24,967; total	53,366
Operating profit	$247,866
Other income	10,411
Total income	$258,277
Dividends paid	160,000
Provision for income taxes	32,617
Balance, surplus	$65,660
Previous surplus	165,161
Less—Income tax on 1923 profits, $21,650; surplus adj., $804; total	22,454
Profit and loss, December 31, 1924	$208,367

Peerless Cement Bond Issue

THE Peerless Portland Cement Co., First National Bank Building, Detroit, is disposing of a bond issue of $1,750,000, a portion of the proceeds to be used for the completion of its new mill now in course of building on the River Rouge, Detroit city limits. Colonel William M. Hatch is president.

Arundel Corporation Dividend

THE directors of the Arundel Corporation, sand and gravel producers, Baltimore, Md., have declared a quarterly dividend of 30 cents per share on the new no par common stock, payable April 1 to holders of record March 27. This is equivalent to $6 per share per annum on the old common stock (par $50), on which the company paid last year four regular quarterly dividends of $1 and an extra dividend of $2 per share.

The stockholders on February 27 approved the issuance of five shares of new no par value stock in exchange for each share (par $50) outstanding.

The committee on securities, Baltimore Stock Exchange, has approved the listing of 500,000 shares (no par value) common stock.

Balance Sheet as of January 31, 1925

Assets—	
Land, bldgs., mach'y, etc.	$4,327,717
Cash	139,872
Materials on hand	22,658
Accounts receivable	749,532
Bills receivable	60,936
Investments	717,195
Unexpired insurance	22,777
Total	$6,040,687
Liabilities—	
Capital stock	$4,915,556
Accounts payable	173,554
Bills payable	25,000
Federal tax	155,221
Reserve for insurance	67,776
Surplus	703,580
Total	$6,040,687

RECENT QUOTATIONS ON STOCK IN ROCK PRODUCTS CORPORATIONS

(These are the most recent quotations available at this printing. Revisions, corrections and supplemental information will be welcomed by the editor.)

Stock	Date	Par	Price bid	Price asked	Dividend rate
Alpha Portland Cement Co.	.....	100	90	95	
Arundel Corporation (sand and gravel—new stock)	Mar. 27	No par	20½	21¾	
Arundel Corporation	Feb. 11	50	112	113½	
Atlas Portland Cement Co.	.....	100	126	129	
Boston Sand & Gravel Co.	Mar. 27	100	63½	63½	
Canada Cement Co., Ltd.	Mar. 31	100	100	102	1½% quar. Apr. 16
Canada Cement Co., Ltd. (preferred)	.....	.....	.....	.....	
Charles Warner Co. (lime, crushed stone, sand and gravel)	Mar. 30	No par	20	22	
Charles Warner Co. (preferred)	Mar. 30	100	99	102	
Giant Portland Cement Co.	Mar. 27	.....	20½	21	
Ideal Cement Co.	Mar. 31	No par	57	60	75c Mar. 31
Ideal Cement Co. (preferred)	Mar. 16	100	.....	.....	1¾% quar. Mar. 31
International Cement Co. (common)	Mar. 30	No par	54	54	$1 Mar. 31
International Cement Co. (preferred)	.....	100	.....	.....	1¾% quar. Mar. 31
Kelley Island Lime & Transport Co.	Dec. 31, 1924	100	102	104	2% quar.
Lehigh Portland Cement Co.	Feb. 13	.....	67	69	1½% quar. Apr. 1
Missouri Portland Cement Co.	Mar. 16	.....	43¼	43¾	
Pacific Portland Cement Co., Consolidated	Mar. 28	.....	81½	82	
Sandusky Cement Co. (common)	.....	.....	.....	.....	2% quar. Apr. 1, 100% payable in com. stock, Apr. 1
Santa Cruz Portland Cement Co.	Mar. 15	100	103½	.....	6% bonds
Santa Cruz Portland Cement Co.	Mar. 28	.....	.....	60	
United States Gypsum Co. (common)	Mar. 31	No par	129	135	40c quar. Mar. 30
United States Gypsum Co. (preferred)	Mar. 16	100	115	115	1¾% quar. Mar. 30
Wolverine Cement Co.	Mar. 27	.....	11¼	12	

Editorial Comment

A Costly Lesson

There will always be a temptation to the contractor to go into the material business. But any contractor who feels inclined to do so may profitably ponder upon the following true story: Not so long ago, a man walked into the office of one of the big producers (who is very well known in the National Sand and Gravel Association) and asked for permission to visit this producer's plants and learn something of his methods. It was cheerfully granted him, and he spent several days in studying the plants and then announced he was going back to his own state and produce the sand and gravel he needed to use in a big road contract. It was pointed out to him that the plant he had seen represented not so much an investment of money and equipment as it did years of effort in building up an organization and learning how to do things—and also how not to do them. But this did not impress him. He went back to his own state and put in the plant as he had planned to do. Unlike many another in similar circumstances, this contractor was a genuine sport. At the end of a year he informed the producer whose plant he had visited that his sand and gravel cost him one dollar a yard more than he could have bought it for from established producers in the same locality, so he sold his plant and gave his whole attention to contracting.

We feel sure that many similar cases occur where the contractor is not so frank. Children have to have their fingers burned to appreciate when an object is hot. Engineers and contractors have to learn a lot by experience. Unfortunately it is the public that pays the bill.

Surface and Fineness Moduli

On page 54 of the March 21 issue of ROCK PRODUCTS there is a chart on which the surface moduli of certain sands are plotted as ordinates and the fineness moduli as abcissae. If these have a direct relation, the plotted points should lie on a curve. It is shown that they do not lie exactly on a curve but nearly so, and the divergence is less as the surface modulus decreases and the fineness modulus increases. In other words, when those sands which should be employed in making concrete are compared, either the surface modulus or the fineness modulus may be taken as indicating the mortar strength for the same mix and water cement ratio.

This bears out the idea that, regardless of controversy as to theory, the fineness modulus is a thoroughly sound foundation from which to start the design of a concrete mixture. It has the more important advantage of being easily found "on the job," and of being applied by a simple calculation and reference to tables. In fact, this work is so simple that one engineer applied it wherever a car of coarse aggregate was received on a large bridge job, and thus avoided the insistence of uniformity of grading which some engineers are unreasonably demanding. Any method of mixing concrete must first of all be practicable and the use of the fineness modulus has practicability as its first recommendation.

Oil-Engine Power

There is a growing belief in the rock products industry that power companies, in some instances, are asking more than a fair price for electric current. Since there is no gainsaying the economy and convenience of electric power, many operators are inclined to accept what appears to be the inevitable, grumble, but make the best of it. Of course, it is difficult to say in any particular case, without a thorough analysis, whether electricity charges are fair or not; there certainly is a great variety of rates paid, and shrewd operators in a number of instances have been able to drive good bargains.

In spite of the monopolistic character of such public utility service, rock products operators, as a matter of fact, are not completely in the hands of the power companies. There is a growing interest in crude-oil engines, particularly Diesel engines, as prime movers. These have been so perfected in very recent years as to be a wholly reliable source of power. Direct-connected to electric generator units an operator may still have all the advantages of electric power, and in many instances at less cost than the local power company can produce it for.

American ingenuity invariably finds a way out of any problem. The coal operators took advantage of a strike and a shortage in coal, a few years back, to gouge consumers. Today, in spite of the great industrial activity of the country, coal production is at extraordinarily low ebb. The reason is that power users have turned to other kinds of power. The producers of petroleum were big gainers by this change, but the central power stations were also; not only because power consumers wished to be relieved of coal problems, but because in the case of steam-power plants there is real economy of operation in large central plants over isolated small plants.

If central service stations wish to retain the advantages they won through the short-sightedness of the coal operators, they must not fall into the same error of thinking that all industry is in their grasp. Rock products producers can help them see the light by looking into the possibilities of making their own power with modern oil-engine generating units.

Traffic and Transportation

By EDWIN BROOKER, Consulting Transportation and Traffic Expert
Munsey Building, Washington, D. C.

Basis for Haydite Rates—Haydite Being a Burned Clay Competitor of Sand, Gravel and Stone

THE commission, in a mimeographed report on No. 13970, Haydite Co. vs. Atchison, Topeka and Santa Fe et al., has settled a controversy of considerable duration by prescribing a scale to be observed in the making of rates on haydite, from Kansas City to Memphis, and to destinations in Iowa, Kansas, Nebraska, Oklahama, Arkansas, Louisiana and Texas. Haydite is a manufactured clay product, intended to be used as a substitute for sand and gravel in cement concrete construction. The name is one used by the manufacturer. It has no name other than that bestowed by the manufacturer. The report says it can be made by using any clay suitable for making bricks. The clay, the report says, is put into rotary kilns in which it is broken up and baked at the same time. The product, the report said, was clinkers, the coarser of which were used as a substitute for crushed rock, the finer grades as substitutes for sand and gravel.

Haydite, the report said, was lighter in weight, greater in strength, required less labor to handle than sand and gravel. It is a strong competitor of sand and gravel in construction work, says the report, in which the saving of dead weight is desirable, as in the construction of tall office buildings and the addition of stories thereto. It is shipped greater distances than sand or gravel. But because of its greater cost, about $4 per ton at point of production, it is not a competitor of sand and gravel in road work or other construction work in which the weight of the concrete is of no importance. Sand and gravel are worth about 70 cents per ton at Kansas City and crushed rock about $1.60, so haydite is competitive only where weight is a moving consideration.

In its essential features the question was as to what rate to apply to a new article of commerce. For a time it was rated the same as fire clay. Then a few specific rates applicable to haydite were published on the basis of the rates on sand and gravel mileage scales in effect on the Rock Island and the Frisco between Kansas, Missouri and Arkansas. The complaint contended the rates were unreasonable and unduly prejudicial to the extent they exceeded those on sand and gravel prescribed in the Shreveport case, 48 I. C. C., 312, 351. The carriers contended that the sand and gravel scale prescribed in the Shreveport case was intended to remove undue prejudice and not primarily to establish inherently reasonable rates. The commission agreed with the carriers to the extent of saying that haydite should not be classed with sand and gravel for rate-making purposes. In disposing of the case it said:

> Neither in character, value nor use is haydite to be classed with sand and gravel for rate-making purposes. It is a manufactured article, of considerably higher value than sand and gravel, and with a decided advantage over sand and gravel in certain lines of construction. It should take a higher rate than sand and gravel.
>
> The complainant asks for a common scale of rates from Kansas City to all of the destination territory in issue. This request is not opposed by the defendants. Without expressing an opinion as to the propriety of such scales for other traffic throughout all this territory, a common basis is believed proper for haydite. We find that reasonable maximum rates for haydite from Kansas City to all of the destinations in issue would be those shown in the table hereto subjoined.

MILEAGE SCALE, IN CENTS PER HUNDRED POUNDS FOR SINGLE LINE HAUL*

10 miles and under	4
20 miles and over 10	4.5
30 miles and over 20	5
40 miles and over 30	5.5
50 miles and over 40	6
60 miles and over 50	6.5
70 miles and over 60	7
80 miles and over 70	7.5
90 miles and over 80	8
100 miles and over 90	8.5
120 miles and over 100	9
140 miles and over 120	9.5
160 miles and over 140	10
180 miles and over 160	10.5
200 miles and over 180	11
225 miles and over 200	11.5
250 miles and over 225	12
275 miles and over 250	12.5
300 miles and over 275	13
325 miles and over 300	13.5
350 miles and over 325	14
375 miles and over 350	14.5
400 miles and over 375	15
430 miles and over 400	15.5
460 miles and over 430	16
490 miles and over 460	16.5
520 miles and over 490	17
550 miles and over 520	17.5
600 miles and over 550	18
650 miles and over 600	18.5
700 miles and over 650	19
750 miles and over 700	19.5
800 miles and over 750	20
Memphis bridge toll	1

Joint-line differential 1.(†) (†) For each block up to and including 490 miles. For 520 mile block .5 cent. No joint-line differential beyond 520 miles.

—*Traffic World.*

Crushed Asphalt Rock Rates

A FINDING of unreasonableness, as to rates and minimum weight on crushed asphalt rock from Dougherty, Okla., to Kansas City, an award of reparation and an order prescribing rates for the future not later than April 24, have been made in No. 15926, G. G. Roudebush vs. Atchison, Topeka and Santa Fe et al., mimeographed. The complaint alleged the rates and minimum weight since April 19, 1922, had been, were and would be unjust, unreasonable, unjustly discriminatory and unduly prejudicial.

The crushed rock, containing about 7% of asphalt or crude oil, the report said, was used as an aggregate in the laying of asphalt pavement and was worth about $3 per ton at the quarries. At first it was shipped as rock, but later in ground or pulverized form. On July 1, 1922, the 15.5 cent rate in effect prior to that day became 14 cents. The complainant contended that the rate should not exceed 12 cents on a minimum of 80,000 lb. The present minimum is the marked capacity of the car. The contention in favor of 12 cents was based, the report said, upon Memphis-Southwestern Investigation, 77 I. C. C. 473, in which the commission prescribed a sand and gravel scale which would give a rate of 12 cents from Dougherty to Kansas City.

To show the unreasonableness of the minimum, the complainant said that in a given period cars for 39 shipments were furnished, with marked capacities ranging from 80,000 to 140,000 lb., not one of which would hold that much when loaded to full visible capacity. The defendants contended that the present tariff rules protected a shipper in cases where cars loaded to full visible capacity would not hold the weight shown in the marking. The commission's finding, other than the one that the complainant made shipments and was entitled to reparation, is as follows:

> We find that the rate assailed was, is, and for the future will be, unreasonable to the extent that it exceeded 14.5 cents prior to July 1, 1922, and 13 cents thereafter. We further find that defendants' minimum carload weight rules were, are, and for the future will be, unreasonable in that they did not, and do not, provide for the assessment of charges on the actual weight of shipment when car is loaded to full visible capacity.

—*Traffic World.*

Chicago Sand and Gravel Rates

IN a mimeographed report on I. and S. No. 2283, sand and gravel between points in Illinois and Wisconsin, the Commission found the proposed rates on sand and gravel, from points in Illinois and Wisconsin on the Chicago & North Western, to Chicago not justified. It ordered the suspended schedules canceled without prejudice to the filing of new ones in conformity with the views expressed in the report.

The schedules proposed increases and reductions in the local rates, from points in the so-called inner and outer zones, in Illinois and Wisconsin, to destinations in the Chicago switching district.

Waukesha and Janesville, Wis., and Rockford, Ill., were treated as typical of the outer

zone points of origin and Waukegan and Elgin, as typical points in the inner zone of origin. The destinations extend from Peterson avenue to Greenwood boulevard of the Mayfair cut-off of the North Western and from Evanston to Ravenswood on its lake shore division.

The Commission discussed the proposed rates in the light of its decision in Chicago Sand and Gravel Producers vs. Director-General, 64 I. C. C. 37, and then said:

Although the proposed rates appear to be reasonable per se, they would result in a division of the destination territory into two distinct districts. Such a division was not contemplated by the Chicago Producers Case and was also condemned by us in Sand and Gravel from Wisconsin, 89 I. C. C. 484, wherein we said of the Chicago Producers Case:

The record in that case did not afford a basis for a finding that rates to Rogers Park, Peterson Avenue, and related points on the Lake Shore and Mayfair-Evanston divisions in the outer switching zones should be maintained on a higher basis than to other points in the Chicago switching district.

A similar conclusion is warranted upon this record. Respondent should publish rates from the outer zone, including Waukesha, which are the same to all destinations in the Chicago switching district as defined in Agent Lowrey's tariff, at the same time preserving the differential of a .25 cent as between the inner and outer zones, and observing as a maximum a rate of 3.5 cents from the outer zone, and including Waukesha.

We find that the suspended schedules have not been justified. An order will be entered requiring their cancelation and discontinuing this proceeding without prejudice to the filing of new schedules in conformity with the views herein expressed. If such action is not taken within 60 days from the date of service of this report the matter may be again brought to our attention.—*Traffic World.*

Freight Rates on Canadian Cement

THE Board of Railway Commissioners for Canada has adopted as its judgment, the report of its assistant chief traffic officer in the complaint of the Canada Cement Co., Montreal, against increases shown in the rates on cement and stone dust in Canadian National Railway supplement No. 28 to G. T. R. Tariff C. D. 88 C. R. C. E-4441 effective July 19, 1924.

The complaint was first made against the increase of one half cent per 100 lb. in the rate on cement from Montreal to Upton, St. Liboire, and Britannia Mills, P. Q. and afterwards enlarged to include an application for a general adjustment of rates on cement from Montreal to stations on the Canadian National in Quebec south of the St. Lawrence to the same basis as published to Canadian National stations north of the St. Lawrence for equivalent mileage. At a conference, the railway offered to make certain reductions varying from one half cent to two cents per 100; also to absorb the entire amount of switching charges amounting to $5.00 per car in place of the present absorption of $3.00. The complainants refused this unless additional reductions to certain other points were made.

The report of the chief traffic officer says, in part:

The company's offer to absorb the entire harbor commissioners' charge in addition to the adjustment of the rates intermediate to Quebec is, in my opinion, a liberal one, and I therefore recommend that the offer of the rates as contained in letter of R. W. Long to Alistair Fraser, dated December 19, 1924, be accepted as a proper adjustment of rates on cement from Montreal to Grand Trunk railway points, except that the 15½-cent rate should also be published to stations north of Aston Junction to St. Gregoire.

No action appears to have been taken in connection with rates to Intercolonial railway points between Ste. Rosalio Junction and Chaudiere, including the Nicolet branch, but as this line is adjacent to the Grand Trunk and a part of the Canadian National railways a similar basis of rates should be applied.

I therefore further rceommend that the railway company be required to make adjustment in rates on cement from Montreal—

To stations Aston Junction to St. Nicholas, inclusive, 15½ cents; St. George to Nicolet, 15½ cents; St. Leonard, 14½ cents per 100 lb.; and that to points between Ste. Rosalie Junction and St. Leonard the rates be reasonably scaled.—*Traffic World.*

Pacific Coast Gypsum Company Goes to Receiver

J. H. DOUGLAS has been appointed receiver for the Pacific Coast Gypsum Co. of Tacoma, Wash., following petition of the Bank of California N. A., which filed suit for $99,000 against the company in superior court.

The bank declares in the complaint that the assets of the company are less than the $99,000 it owes the bank under mortgage notes issued and asked the court to appoint a receiver to take over the affairs of the corporation in order that a judgment might be recovered against the debt.

It is set forth in the complaint that the gypsum mines of the company in Alaska have not been operating for the past six months, owing to floods, that the local concern is not running because of lack of gypsum and scarcity of funds, and that the building is old and the machinery is deteriorating.

The Tacoma Chamber of Commerce and the Real Estate Board made efforts recently to urge the owners to continue the operation of the plant in Tacoma when it was reported that the company was merging with the Standard Gypsum Co. of California and building a new plant in Seattle, after abandoning the Tacoma plant.—*Tacoma (Wash.) News-Tribune.*

Death of J. W. Louder

J. W. LOUDER, well and favorably known in the cement industry, with which he was connected for the past thirty years, died on March 7.

Mr. Louder was a graduate of Lafayette College in 1895, where he pursued a special chemical course. Upon completion of these studies he became chemist for the Atlas Portland Cement Co. at their Northampton, Penn., plant, and in 1896 was made assistant superintendent. He occupied this position until 1906 when he went to Rowelsburg, W. Va., as superintendent of the Buckhorn Cement Co., which plant is now operated by the Alpha Portland Cement Co. In 1908 Mr. Louder was made superintendent of the Nazareth Cement Co., which position he held until 1924, at which time he was made assistant to the president.

Mr. Louder had a thorough knowledge of cement manufacture both from a theoretical and practical standpoint and his ability was generally recognized not only in the Nazareth region but throughout the industry in the United States. His death is a loss not only to the Nazareth company but will be felt in general throughout the industry.

United States Gypsum Company to Enlarge West Coast Plants

HOUSES built entirely of the new form of gypsum called "Structolite" concrete described in ROCK PRODUCTS, December 13, 1924, are to be introduced in southern California, and the California plants of the United States Gypsum Co. will be enlarged immediately to manufacture this and other new building materials, C. A. English, Pacific coast manager of the concern announced following his return from a trip to the east.

"Big additions to our present plant supplying California will be built this summer," he said, "so that 'Sheetrock' fireproof gypsum wallboard, which until now has been supplied to California home builders from plants in Texas and Oklahoma, can be made here at home.

"This will mean large savings in cost because of decreased freight."

Mr. English also announced that his firm this year will erect a new gypsum plant at Blythe, Calif., where it has held a large gypsum deposit undeveloped for several years.

"This property is being opened up at this time because the United States Gypsum Co.., appreciates the rapid growth of Southern California and wish to take advantage of the big demand for their products that growth offers."—*Los Angeles (Calif.) Examiner.*

The gypsum wall-board industry on the west coast is controlled by a patent and is on a royalty basis. Decisions have not yet been obtained in other U. S. district courts.

A Good Example of "Hick" Legislation

IT is not to be wondered that bills to establish state cement plants are occasionally passed by some of our state legislatures, judging by the mental calibre of some of the members of these legislatures. Witness the following:

A bill for regulating the sale of cement in Iowa, specifying that the package of cement shall contain a statement of the weight, the chemical composition and other data has been introduced in the Iowa senate by Senator Schmedlka of Hardin county.

Following is the bill:

Section 1. It shall be unlawful to sell cement in the state of Iowa except the packages in which it is contained be branded as provided for in this act.

Section 2. Each package of cement shall be branded substantially in one or the other of the following forms:

FORM NO. 1

This package contains.....cement manufactured by the.....Co. of.....

.....Per cent of this cement is guaranteed to pass a bureau of standards sieve known as a 100-mesh sieve. Similarly.....per cent will pass a 150-mesh sieve and..... per cent will pass a 200-mesh sieve.

The chemical composition of it as follows is correct to within 5% of the quantities indicated:

Materials	Percentage	Per Cent of Colloids
.....	.....%	.....%
.....	.....%	.....%
.....	.....%	.....%
.....	.....%	.....%
Total.....	.....%	.....%

The.....company hereby guarantees that it will replace without charge any work which is made from this cement which fails to give reasonable satisfaction.

But to avail the customer of the benefit of this clause, it will be necessary to file with the manufacturing company a certificate of a competent engineer that the work has been done in accordance with good engineering practice. Said certificate to be filed within one calendar month after the completion of the work, the company having the right to reject such certificate on the grounds of incompetency of the engineer.

FORM NO. 2

The cement herein contained is an indeterminate chemical composition of limestone, clay with not to exceed.....per cent of coal ashes and other impurities.

It is guaranteed to weigh.....lb.....% will pass a bureau of standards sieve known as a.....mesh sieve. Similarly.....% will pass a.....mesh sieve. Other than the above is unguaranteed.

Section 3. Except as provided below, such branding shall be done by means of printing on sacks or on barrels, or on pasters attached to the same. Said printing shall occupy a space of not less than 1 sq. ft. Printing in Form No. 1 shall be in blue. Printing in Form No. 2 shall be in red. Cars and wagons engaged in the delivery of what is known as "bulk cement" shall be deemed "packages" within the meaning of this section, and while engaged in such deliveries must have such printing posted on them in a conspicuous place.

Provided, however, in case of emergencies a card, essentially the same as a common shipping tag, may be used which shall have the same reading as specified above. Packages which are on hand or have left the mills not more than one month previous to the taking effect of this act may be tagged with a blue card carrying the following reading matter: "Bought before.....and not subject to the law at present in force."

Section 4. The vendor of cement shall be deemed to be one who caused it to be branded if it is branded. If it is not, then he shall be deemed to be the one actually making the sale unless such person be a clerk, in which case the vendor shall be deemed to be his employer.

Section 5. The violation of the provisions of this act shall be deemed to be a misdemeanor, and, in addition thereto, the vendor shall be liable to the vendee for all damages resulting therefrom.

Oregon Cement Manufacturers Fight Unfair Preferential Treatment of Foreign Product

IMPORTERS of foreign portland cement are seeking a reduction of port charges at Portland, Ore., in order to have an additional price advantage over cement made by American manufacturers. The Seattle, Wash., *Journal of Commerce* states:

"The fact that approximately 34,000 bbl. of European cement is in storage in Portland and that it is not moving in competition with Oregon-made cement, although no duty is collectible on it, is said to be the reason prompting the importers to seek a reduction in this port's charges for wharfage, storage, loading, unloading and handling. The imported cement is said to be untaxed locally.

Preliminary to a hearing on the question, which Oregon cement manufacturers hope will be publicly conducted, the operating committee of the dock commission—Ira L. Powers, A. H. Averill and F. C. Knapp—will hold a conference. This committee will make a recommendation to the commission as to further reduction of port charges on imported cement and later a hearing on the issue may be called. Aligned with the three Oregon cement producing companies is the Associated Industries of Oregon, which will undertake to show that if European cement be given preferential treatment by port authorities the result will end to break down one of the state' growing payroll industries.

According to Dan C. Freeman, manager of the Associated Industries of Oregon, some lots of European cement received as ballast in Portland have failed to stand up to tests required and this fact has been distorted, he says, to show that Oregon cement was deficient in quality, whereas the home product has stood all tests and saved construction contractors from serious losses when using inferior imported cement.

President D. L. Carpenter, of the Beaver Cement Co., is ready to go to the mat with proponents of the plan to make it easier for European cement to compete with the Oregon product. Aligned with him also are L. C. Howlands, vice-president and manager of the Oregon Portland Cement Co., and George Macdonald, the active head of the new Sun Portland Cement Co., whose production plant is at Lime, in eastern Oregon.

California cement brought to Portland by water routes acts as a price regulator in this market, say traffic men and cement manufacturers, and that thereby Oregon and Washington cement consumers derive the benefit of competition without suffering all of the evils attendant with importations of tax free European cement.

Seattle Requires All Cement Used in General Building Work to Be Tested

ON March 19, the City Superintendent of Building, of Seattle, Wash., Robert Proctor, issued the following notice to builders and architects:

To all users, manufacturers, importers, and all who may be interested in the quality of Portland cement:

Gentlemen: Inasmuch as recent developments in the handling of cement have shown that a more careful and certain supervision of cement is necessary to the safety of the building construction in the City of Seattle, you are advised as follows:

Hereafter, in pursuance with the requirements of sections 401 and 402 of the Building Code of the City of Seattle, all cement used upon any work in the City of Seattle coming under the jurisdiction of the building department, must be accompanied by a certificate of inspection with each load delivered on the job or to the dealer. In the latter case the dealer will supply the user with a fascimile of the certificate of the laboratory, together with his own certification that the consignment is a part of this shipment.

This certificate must be from a recognized testing laboratory and must certify that the delivered cement has been under its constant supervision since the time the samples were taken, that the cement passed a seven-day test made within 60 days of the time of its delivery, and that in all respects it meets the requirements of the City Building Code and the specifications of the A. S. T. M. C-921 as included therein.

A copy of each certificate from the laboratory shall be filed in the office of the superintendent of buildings.

This constant supervision as explained to the manufacturers and importers of both American and foreign cements, will mean that the laboratory handling the cement tests will be the only persons having access to this cement from the time the samples are taken.

This requirement will be in effect commencing April 1, 1925.

Atlas Company Awarded Cement Contract

THE Alabama state board of administration has awarded to the Atlas Portland Cement Co. of Birmingham contract for approximately 55,000 bbl. of cement at a price of $2.57 per bbl. The cement will be supplied by the state to the contractor for the section of the Birmingham-Montgomery highway in Chilton county from Lomax to the Autauga county line, the contract for this road work having been awarded by the state highway commission on condition that the state furnish the cement.—*Birmingham (Ala.) Age-Herald.*

Cement Products

TRADE MARK APPLIED FOR WITH U.S. PATENT OFFICE

Gaining Prestige for Concrete Products in Wisconsin

Wisconsin Concrete Products Association Maps Out a Yearly Program and Then Bends Every Effort Towards Its Accomplishment

By D. R. Collins,
Secretary, Wisconsin Concrete Products Association

"TO IMPROVE the quality of concrete products and extend their uses." That's a big task but one tackled by a far visioned group of men who gathered around a lunch table in Milwaukee one day in January, 1923. They had just come from a Convention session and had listened to a talk by Phil Grau, then secretary of the Milwaukee Association of Commerce. Mr. Grau had told them things about their own industry that had opened their eyes. He had told them of the obstacles that lay in their individual paths and had suggested that they organize to overcome these obstacles. His idea caught on and no sooner had he quit the floor than one of their number arose and proposed that an organization be perfected.

So around the lunch table that noon a program was perfected and late that afternoon the Wisconsin Concrete Products Association came into being. Without a doubt, the largest single factor in the success of this organization is that each year a very definite program of work has been adopted and followed through. This idea of a program, or a platform, was by no means new, but nevertheless a stumbling block which had caused the disintegration of many similar organizations. Once organized and "dressed up" they had no place to go. But this infant looked around and took stock of its common problems—then acted on them.

Analyzing the Common Problems

The first common problem that faced the organization was a lack of uniformity in products then being manufactured in Wisconsin. A standard had been set by the Wisconsin Industrial Commission, charged with the enforcement of the state building code, Some manufacturers were meeting this standard, many were not, and as a result concrete products had a low rating, both with the Industrial Commission and builders in general. Changes were needed in the building code, but could not be forthcoming until the manufacturers themselves

D. R. Collins, secretary-treasurer, Wisconsin Concrete Products Ass'n

showed their sincerity in meeting the requirements then existent.

A check-up of all member plants was immediately made and proper changes were instituted to manufacture a better quality product. The testing machine was brought out of the discard and members were taught its use. Concrete block testing 500 pounds to the square inch were soon replaced with block running between 800 and 1000 pounds. And while all of this was going on the financial side was kept in mind. Better materials and more careful mixing proved to cost no more than shoddy materials and carefree mixes.

Gradually, the *Quality* idea caught on. Builders and architects gained confidence in the products of members of the Association and the day arrived when specifications read "block to be furnished by a member of the Wisconsin Concrete Products Association." Building officials, too, noted the progress and requests for building code changes were given careful attention and acted upon. In fact, such changes are now submitted to the Association for comment and suggestions before action is taken on them.

Certificates of Quality

As a visible means of showing that member plants were producing a quality article, the Association, early in 1924, issued each member complying with the requirements of the state building code a "certificate of quality." This certificate was based on tests of products selected from stock by the local or state building inspector, or by the association secretary, sealed for identification with self-locking seals bearing the Association name and number, and tested by an accredited testing laboratory. The crowning feature of these certificates was that each was countersigned by W. C. Muehlstein, building engineer of the Wisconsin Industrial Commission, attesting the fact that the State of Wisconsin was behind the Association in its effort to "better the quality of concrete products."

And following this came a change in architects' specifications to read: "from a member of the Wisconsin Concrete Products Association holding a certificate of quality."

What a Live Trade Association Really Accomplished

THE Wisconsin Concrete Products Association is a two-year old infant, yet what it has accomplished may well set a pace for older, larger and more important rock products trade associations. Any producer of a rock products material may well read this article with profit; and he should finish with renewed inspiration.—The Editors.

Extracts from the Report of the Secretary of the Wisconsin Concrete Products Association on Activities for 1924.

It has been indeed a difficult task to arrange the work of the secretary so that all might be served in equal proportion. During the past year, your secretary has traveled approximately 20,000 miles, assisting not only members of our organization, but other members of the concrete products industry who were in need of urgent help. This work with the members of the industry has brought about a favorable feeling toward our organization from these other men and we expect it will result in a good number of them being with us as members during the coming year. In order to carry on the work the time has been planned and allotted carefully and every member plant has been visited at least three times during the year.

Quality Campaign

Sufficient work has been done with practically every member of our organization during the past year so that today the quality of the products of our members is above the standards required by the Wisconsin Industrial Commission. This has been brought about by frequent analyses of aggregate and checks on the mixtures used in the various member plants. Not only has it been possible in the majority of cases to increase the quality of our products, but it has also been shown that this can be brought about at no extra expenditure and in many cases at considerable saving.

Merchandising and Advertising

Much assistance has been given members on merchandising and advertising products. Many of our members are following the suggestions given them with a resultant increase in sales and increase in production. In fact a check of the production of member plants made late in December showed that with very few exceptions the production was far in excess of 1923. This members attributed in a large way to the more energetic and more intensive merchandising and advertising system inaugurated in their plants.

During the summer months an advertising campaign featuring concrete masonry houses was carried on in the *Weekly Western Builder*, a trade publication received by every architect in the state and going to a circulation of approximately 1700 builders and those in allied lines. Backing this up, we have started a direct mail advertising campaign which will extend over a period of twenty-six weeks, carrying once every 15 days a message on concrete building units to a list of 2400 names furnished us in the most part by our members.

Work With Architects, Contractors and Builders

Wherever requested by individual members, work has been done with individual architects, contractors and builders to convince them of the merits of our product. During the year much literature has also been distributed to this class of trade, calling their attention to our materials and telling why they should be used in preference to those of our competitors. It is interesting to note the change in the attitude on the part of many of these men who formerly scoffed at the mention of concrete products but who are now eager to ask questions and learn further regarding the merits of concrete building units.

One of the first moves on the part of the association secretary was to keep each of the members constantly in touch with what was going on, not only in the state, but outside. Subscriptions were taken out for each member for the leading publications of the industry. A weekly letter service was also instigated.

Weekly Letters

This weekly letter service is one of the high spots in the Association service of its members. Each week a letter goes out to all members giving them suggestions of help in their business. The "platform" adopted at each annual meeting is the guide for these letters and each "plank" is touched on several times during the year.

The letter this week may be on "Insurance Rates," with samples of literature to be sent builders and a specimen letter to go with it. Next week the enclosure with the letter may be 20 sample advertisements to help the member in his newspaper advertising. Perhaps the week following, the letter will contain information on "Building Codes" and the week following it may contain a new booklet issued by the Portland Cement Association on manufacturing methods. Each letter is punched to fit a standard sized loose-leaf binder, which is furnished by the Association.

Another service given, not only to members, but to every concrete products manufacturer in Wisconsin, is a little monthly publication, "The Wisconsin Concrete Products Digest." No attempt is made to attain literary style in this magazine. It is simply full of homely advice and suggestions on quality products and better merchandising methods. The greater share of this material is drawn from the experiences of Wisconsin manufacturers, their ideas being passed on in this manner so that their brother manufacturers may draw on them.

Stress on Merchandising

A realization of the fact that most concrete products manufacturers were weak on merchandising their product has caused the Association to stress this portion of their program. New merchandising methods have been continually brought to the attention of the members and vast quantities of sales literature given to them with suggested methods of distributing it. For the past two years a direct mail campaign to architects, contractors, building and loan associations, prospective builders and others, has been carried on. This usually extends over a period of six months—a piece of promotive literature being placed in the hands of 2400 prospects every fifteen days.

Administration

The administrative body is composed of eight district representatives, located at strategic points throughout the state, and an executive committee of three members having full power to act for the Association in all matters. The secretary of the Association, who is field representative for the Portland Cement Association in Wisconsin, handles the bulk of the office routine and is active in the field. During the year he visits each member plant from two to five times, assisting in the manufacturing problems and helping each manufacturer in any manner deemed necessary. The offices of the Association are furnished by the Portland Cement Association who have given untold assistance, without which it would have been impossible to carry out the comprehensive program outlined above.

C. D. Gochnauer, president, Wisconsin Concrete Products Association

That the Association idea has caught on and held in Wisconsin is no idle dream. From the small group of men who charted its course in 1923, it has grown to an organization recognized throughout the state as being made up of the leaders of the concrete products industry.

Freight Rates

The question of freight rates has been handled carefully by a committee appointed following our last convention. The matter has been given much thought and attention by the members of this committee. No definite action has taken place, but the committee has familiarized itself with all pending changes and it is in a position to act when the opportunity presents itself. The committee has furnished members with information on the best methods of loading, etc., under the present tariff regulations.

Building Codes

Close touch has been kept with all building officials in the State of Wisconsin and in two specific instances our recommendations have been followed practically verbatim. Several other building codes are now pending in various cities throughout the state. A close check has been made on the first draft of these codes, suggestions offered, and the entire code will be followed through to see that we are not discriminated against in any legislation of this sort.

House Construction

While the number of concrete masonry houses built during the past year has been rather a disappointment, we are proud to announce that twelve of our own members have built houses of this type for their own use and have become real boosters for this type of construction. In this regard, I want to say a word with reference to the sale of concrete masonry houses. In the past the products manufacturer himself had not been convinced that this method of construction was entirely practical. The fact that so many of our members have built houses of this type during 1924 has not only convinced them of the practicability of concrete masonry construction, but has inspired public confidence by their demonstration of confidence in their own product.

To the Portland Cement Association, Milwaukee office, must go the credit for the fact that our organization has been able to function and live during the past few years. It is also to them that we must look for continued co-operation in order that we may continue our work in the future. The offices of the Portland Cement Association have been our headquarters and they have furnished you your secretary. In other words, the income of the Wisconsin Concrete Products Association has been expended entirely in your own interests. This, of course, has allowed us to do the great amount of work that has been done.

During the past year an effort has been made to extend the activities of the organization in the building unit field. In the past, concrete block has been emphasized in promotion simply because by far the greater majority of our members are manufacturers of this product alone. During the latter part of this year an effort has been made to extend our promotion to include concrete brick in a much larger sense than ever before. Concrete trim has also received a good share of attention during the past year and wherever possible architects and contractors have been interviewed regarding its use and encouraged to use products manufactured by member plants.

Concrete Products Company Classification of Accounts

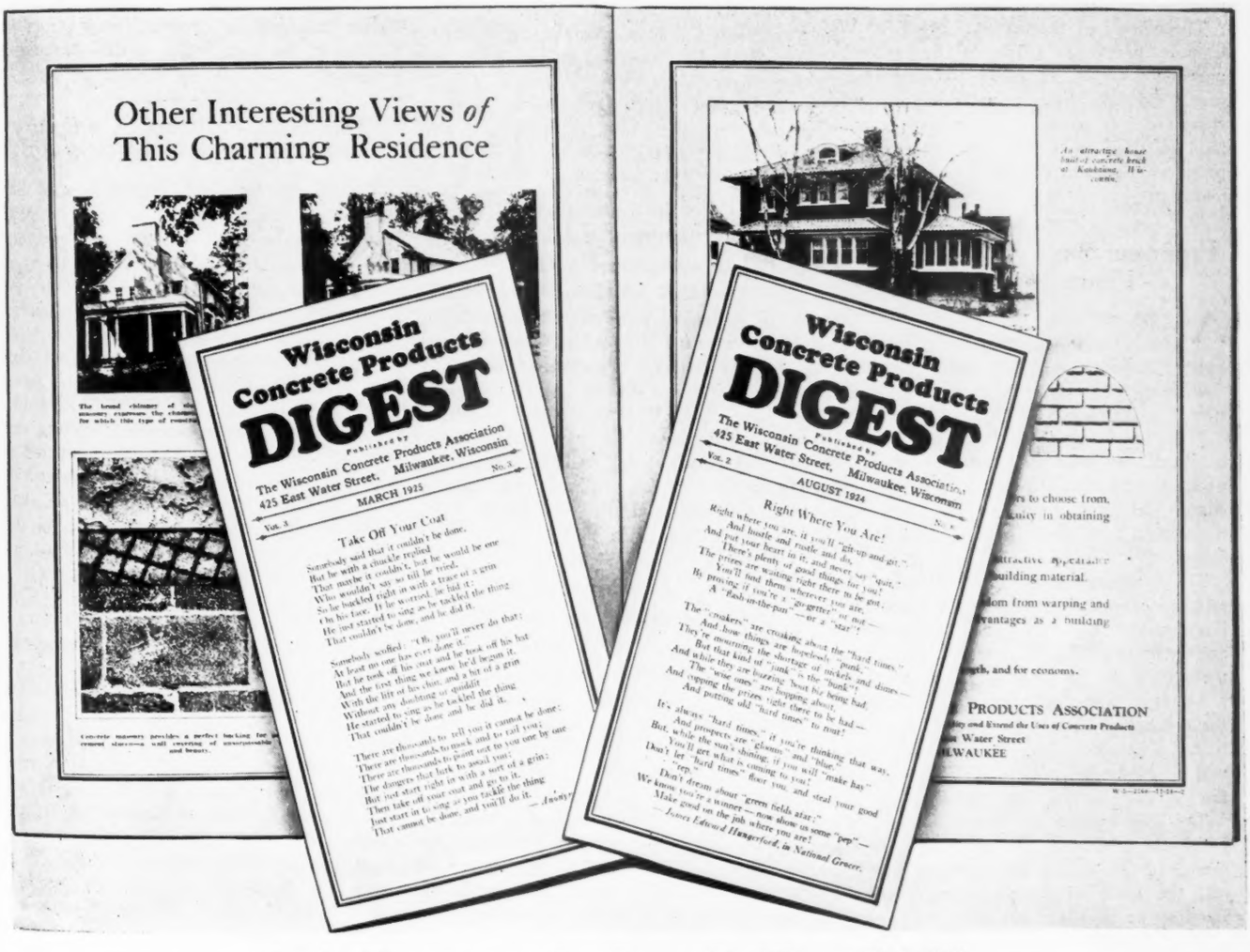
PLANT EXPENSE.
- Superintendence.
- Plant labor.
- Other labor.
- Gas, oil and grease.
- Power and light.
- Freight incoming.
- Fuel.
- Repairs—machinery and equipment.
- Repairs—bins and conveyors.
- Repairs—buildings.
- Other miscellaneous plant expense.
- Depreciation—building.
- Depreciation—machinery.
- Depreciation—small tools and equipment.
- Depreciation—gravel bins and equipment.

SELLING EXPENSE.
- Salesmen salaries.
- Salesmen expense.
- Advertising.

DELIVERING.
- Wages—truck drivers and helpers.
- Freight paid out of town orders.
- Gas, oil and grease.
- Repairs—truck.
- Miscellaneous delivering expense.
- Depreciation delivery equipment.

ADMINISTRATION EXPENSE.
- Officers or proprietor salaries.
- Officer help.
- Office expense.

GENERAL.
- Taxes paid.
- Interest paid.
- Insurance paid.
- Other general expense.


Other Interesting Views of This Charming Residence
Wisconsin Concrete Products DIGEST
Published by The Wisconsin Concrete Products Association 425 East Water Street, Milwaukee, Wisconsin
MARCH 1925
Take Off Your Coat
Wisconsin Concrete Products DIGEST
Published by The Wisconsin Concrete Products Association 425 East Water Street, Milwaukee, Wisconsin
AUGUST 1924
Right Where You Are!

Sample of literature prepared—and two copies of the monthly bulletin

New Springfield, Missouri Rock Crushing Plant in Operation

THE new rock crushing plant of the Stigall Construction Co., at Springfield, Mo., has begun full operation and has a capacity of 500 tons daily, according to the *Springfield (Mo.) Republican.*

The property of the company consists of 27 acres underlaid with a strata of limestone rock to a depth of over 196 ft., it is claimed. At present the rock is blasted within three feet of the surface and loaded into special dump cars and conveyed thus up inclined tracks to the crushers. The first crusher breaks the material down to about 2 in. and the second crushes it to limestone sand. After passing through the crushers the material is conveyed by a bucket elevator to a cylindrical screen, 26 ft. long. This screen has three sizes of perforations, the first section screens out the limestone sand, the second section removes the material from ¾-in. down and the third 2-in. and under.

Power for the plant is furnished by a 100 h.p. Fairbanks-Morse two-cycle Deisel engine. This engine drives the two crushers, a centrifugal water pump, an air compressor, hoisting machinery and cables for drawing the cars from the quarry.

The officers of the company are Fred W. Garrett, president; Clyde O. Sperry, vice president; W. M. Thornton, secretary-treasurer. Ed. Stigall, who until recently was superintendent of the Springfield special road district of which Mr. Sperry was president, designed the plant and is general manager.

Proposed State Crushed Stone Plants for Illinois

AN appropriation of $250,000 to build four limestone crushing plants in Southern Illinois has been asked from the Legislature by Representative Claude L. Rew of Harrisburg, Ill.

"The use of crushed limestone will rehabilitate hundreds of thousands of acres of farm land in the southeastern part of the State. In fact, there is need for lime throughout Illinois," said Representative Rew.

The crushing plants are intended to be self-supporting and they would supply the limestone to farmers at cost. Negotiations are under way to get a low freight rate on the rock from the plant to the consumer.

Tentative plans have been laid to establish the crushers in Pope, Massac, Johnson and Saline Counties. The Pope County plant will probably be located at Golconda, and the Johnson County plant at Belknap.

The Department of Public Works and Buildings would run the plants, if the assembly decides to grant the appropriation, and the price of the limestone would be fixed so as to allow the state 5% interest on the money invested in buildings and machinery.—*St. Louis (Mo.) Post Dispatch.*

Correction

THE statement, in connection with an article on the use of slate flour in waterproofing concrete products on page 77 of the issue of February 21, that slate flour is produced as a by-product in the manufacture of roofing granules in England was erroneous, according to a statement from S. McPherson, general secretary of the British Institution of Quarry Managers. No roofing granules are made in that country but slate flour is manufactured from slate waste by pulverizers. Its principal use at present, though somewhat limited, is that of a filler for asphalt road material.

Solvay Process Company to Reopen Hutchinson Quarry

ANNOUNCEMENT has been made that the soda ash plant of the Solvay Process Co. at Hutchinson, Kan., is soon to begin operations again after being closed down for several years.

A. L. Campbell, chief engineer for the company, whose headquarters are at New York, has been here for some time looking the plant over to determine what is needed in the way of new machinery and equipment, made the announcement that it was the intentions of the company to reopen the plant in the near future.

The plant which includes a limestone quarry employes about 400 people.—*Hutchinson (Kan.) Herald.*

Rock Products Companies Stung in Employers' Liability Insurance Failure

FOLLOWING bankruptcy proceeding filed against the Associated Employers' Reciprocal of Chicago last year, the case has been brought into federal court. If stated claims are granted, according to the *Spokane (Wash.) Chronicle,* northwest firms will have to pay approximately $129,650. Among the Spokane firms facing assessment are International Portland Cement Co., Ltd. and the Washington Brick, Lime and Sewer Pipe Co.

Guy R. Varnum Buys Additional Interest in Vermont Quarry Firm

GUY R. VARNUM, president of the Big Tejunga Rock and Gravel Co., of Los Angeles, Calif., and James M. Boutwell have purchased the interests of Mrs. George B. and J. Edmund Milne in Boutwell, Milne and Varnum Co., Barre, Vt. Mr. Boutwell is the president of the company and Mr. Varnum is now vice-president and will return from California, where he has resided for the past few years, and assist in the operation of the quarries, according to the *Boston (Mass.) Globe.* He at one time was superintendent of this company.

New Company Will Build Crushed Stone Plant at DeKalb, N. Y.

PAPERS were filed recently with the secretary of state at Albany, N. Y., incorporating the DeKalb White Marble Co., Inc., of Gouveneur, N. Y. The company is capitalized at $20,000 and the following are named as officers: J. H. McLear, of Gouverneur, president; Henry Donigar, New York, treasurer; E. M. Cummings, New York, vice president and sales manager. The offices of the company are at Gouverneur and 101 Park avenue, New York.

The plans call for the immediate erection of a crushing and screening plant in the town of DeKalb, on property adjacent to that of the Green Hill Mining Co., which is also owned by the McLear interests. The products of the company will include crushed stone, stucco dash and marble dust, and the storage of the finished material will be by four silos.

The quarry contains an attractive white crystalline marble which is free from pyrites and other impurities, it is claimed. The original opening of the quarry was made by the late T. M. Clarkson of the Potsdam Sandstone Co.

The marble will be crushed in various sizes as well as ground for commercial purposes, its pure white quality making it especially adaptable for various uses.

Standard Gypsum Company Plans and Activities

THAT the Standard Gypsum Co., of San Francisco, Calif., is progressing with its rather extensive organization program is evidenced by numerous newspaper reports from the Pacific coast. The contract for dredging the 200 ft. slip to accommodate large vessels has been let to a Seattle dredging company. A seven acre tract at Long Beach, Calif., has been leased for 99 years from the Craig Shipbuilding Co., and a plant and shipping facilities similar to the proposed plant to be erected at Seattle, will be built there. Construction will start immediately according to plans and the plant will have a capacity of 300 tons a day, and will be completed this fall.

The company will mine its gypsum at the San Marcos Island in the Gulf of California, along the coast of Lower California. This island is 1280 miles from Long Beach and the company plans to transport its material with its own fleet of vessels. The steamer *Griffdu,* towing the bark *Palmyra* with 650,000 ft. of lumber, will leave San Francisco with necessary machinery and equipment valued at $750,000 for mining and the gypsum for the island there construct a dock 600 ft. long and mining plant.

Martin Uldall is president of the company and J. A. Seifert, formerly manager of the Pacific Coast Gypsum Co., is assistant to the president. S. A. Perkins is managing director.

Politics Getting Mixed Up with Michigan State Cement Plant

REPRESENTATIVE FRED MING has introduced in the Michigan lower house a bill providing for an appropriation of $150,000 for a state park in Cheboygan county, but in that bill lies a story which has nothing much to do with a state park and which is mightily interesting.

What Representative Ming really has in mind is the erection in Cheboygan county of a prison and a cement plant to be operated for the state by convict labor.

The land which Mr. Ming desires purchased consists of 20-100 acres lying along Pigeon river, where something like 1000 h.p. or upwards of water power may be developed. Near there is a great stone company which takes out limestone for smelter purposes, but this limestone must be in large chunks. The smaller pieces are useless for the purpose for which it is being quarried.

Piled up at Cheboygan is 2,000,000 tons of this limestone which will be given to the state free if a cement plant is built there and more such stone is constantly being left as the quarrying goes on.

Now Mr. Ming's plan provides that, while the whole big tract is taken for state park purposes, the state shall at the same time erect a prison there. He proposes that the convicts shall build it themselves, making use of the limestone there to construct it. They shall likewise erect a cement plant which will later be operated by convicts on behalf of the state.

Mr. Ming also holds that the convicts could be used to set out trees, clear underbrush and clean up the tract, thus carrying on a state reforestation scheme on a large scale through the use of convict labor.

But the situation which is most interesting is the effect of such a plant in Cheboygan on the plant in Chelsea, which the state has leased with the intent to buy from "Ken" Potter, the newly elected state chairman of the Republican party in Michian.

It will be remembered that Mr. Potter had this plant on his hands at Chelsea. It was costing vastly more to operate than the cement plants at Newaygo, Petoskey or anywhere else. As a money-maker it was a failure and when Mr. Potter found Gov. Groesbeck interested in it, it was like finding a brand new Christmas tree.

Finally a deal was closed by which Michigan pays him $75,000 a year rental for the cement plant with the privilege of buying it for $500,000, the rentals being counted in the purchase price.

So far as can be learned, too, the plant has not even been a financial success for the state even with convicts running it at $1 a day. All it has accomplished for Michigan is to assure a supply of cement when wanted, although the claim is made that a lot of the cement turned out is not up to standard and will not stand up in the highways.

Now some of those interested in the Ming bill declare that the governor would like to put this plant in Cheboygan county and let the Chelsea plant slide.

Perhaps recent actions on the part of Mr. Potter, which so aroused the ire of the governor, may have something to do with this ambition to put a cement plant in Cheboygan.

At any rate, it is hardly likely that both plants will be run by the state and Mr. Potter may find his non-paying plant back on his hands. However, he will have recovered some of his previous losses in it through a few years of garnering $75,000 off the state for the lease. But that is the story behind the Ming bill and what happens to the state cement industry will be somewhat interesting to observe.—*Grand Rapids Herald.*

Portland Cement Company of Utah to Make Wet Process Installation

EXPENDITURE of $200,000 in improvements now being made by the Portland Cement Co. of Utah in changing the system of production from the dry to the wet system was announced recently by Ashby Snow, president and general manager in the *Salt Lake City (Utah) Tribune.* The change will enlarge the plant's output from 25 to 30% and will be completed by May 11. The plant is located in Salt Lake City.

In carrying out these improvements the present 8x125 ft. kilns are being replaced by 10x185 ft. rotary kilns and new grinding machinery is being installed. The ten dust chambers are being converted into slurry tanks, elliptical in shape, 31½ ft. deep and 10x15 ft. in diameter.

The officers of the company are Ashby Snow, president and general manager; P. J. Moran, vice president; Herbert A. Snow, secretary-treasurer, purchasing and manager. Erastus Snow is superintendent.

Work on Brazil Portland Cement Plant Started

LATER information on the progress of plans for the construction of the first cement plant worthy of the name in Brazil, noted in the January 10 issue of ROCK PRODUCTS, shows that the plant is being built on the San Paulo railroad by the Brazilian Portland Cement Co. about 15 miles out of the city of San Paulo. The plant will have an initial capacity of 1500 bbl. and the plant is being laid out with the idea that within the next five years it will have four kilns operating with a capacity of 6000 bbl. per day, according to official information. The main machinery is being furnished by the Allis-Chalmers Manufacturing Co. and the electrical equipment by the General Electric Co. The electrical installations include one 200 hp. and two 500 hp. synchronous motors, three 500 kv.a. transformers, two 50 kw. motor generators, 24 motors ranging in size from 10 to 100 hp. and switchboard and substation equipment.

Rumor of Cement Merger

THE consolidation of five cement plants of eastern United States into the North American Cement Corporation which will operate plants covering the United States east of the Rocky Mountains is reported to be under way. New York bankers whose names have not been revealed, according to advices received from Hagerstown, Md., are back of the reported plan.

John J. Porter, general manager of the Security Cement & Lime Co., of Hagerstown, will be vice-president of the corporation and in charge of operations. The transaction with the Security company alone will involve, it was stated, about $5,000,000. —*New York Times.*

Colorado Portland Cement Company Will Double Capacity of Plant

PLANS and specifications have been submitted and approved for improvements to the plant of the Colorado Portland Cement Co. at Portland, Colo., which when completed, will double its capacity. The plant now has an output of 1,000,000 bbl. a year. The new work according to the *Canon City (Colo.) Record,* is to be started at once and the expenditure contemplated with present plans, will aggregate $500,000.

A new mill building is to be erected in which will be installed five new compeb grinding mills each driven by a 600-h.p. synchronous motor. Plans also call for the installation of surface condensers and a new 6000 kw. Allis-Chalmers turbine engine.

Paul Van Zandt, chief engineer for the Ideal Cement Co., is in charge of designing the work and excavation for foundations will be started at once. The whole program will probably be completed by the first of the year.

Signal Mountain Company Improving Cement Plant and Will Build New Office

AT a meeting of the executive committee of the Signal Mountain Portland Cement Co., Chattanooga, Tenn., it authorized the building of a general office building at the east end of its plant to be ready for occupancy this summer when the company will move its offices from the James Bldg. The building will be one story, cover a ground space of 45x90 ft. and cost $15,000.

The new kiln being installed will be in operation by July 1 and give the plant a capacity of 4500 bbl., according to a statement by John L. Senior, president, in a local paper. The cost of erection and equipping this new unit is estimated at $250,000.

The Rock Products Market

Wholesale Prices of Crushed Stone

Prices given are per ton, F. O. B., at producing plant or nearest shipping point

Crushed Limestone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
EASTERN:						
Buffalo, N. Y.			a 1.30 per net ton all sizes			
Chaumont, N. Y.	1.00	.....	1.75	1.50	1.50	1.50
Eastern Pennsylvania	1.35	1.35	1.45	1.35	1.35	1.35
Munns, N. Y.	1.00	1.40	1.40	1.25	1.25	.....
Northern New Jersey	1.60	1.80	1.80	1.40	1.40	.....
Prospect, N. Y.	1.00	1.40	1.40	1.30	1.30	.....
Walford, Penn.	.....	.....	1.35	1.50	1.60	1.60
Watertown, N. Y.	.50	.....	1.75	1.50	1.50	1.50
Western New York	1.15	1.20	1.20	1.20	1.15	1.15
CENTRAL						
Alton, Ill.	1.75	.....	1.75	1.50	.....	.....
Bloomville, Middlepoint, Dunkirk, Bellevue, Waterville, No. Baltimore, Holland, Kenton, New Paris, Ohio; Monroe, Mich.; Huntington, Bluffton, Ind.	1.00	1.10	1.10	1.00	1.00	1.00
Buffalo, Iowa	1.10	.....	1.35	1.05	1.10	1.10
Chicago, Ill.	.80	1.00	1.00	1.00	1.00	1.00
Columbia, Krause, Valmeyer, Ill.	1.15	1.20	1.20	1.20	1.10	1.10
Cypress, Ill.	1.20	1.20	1.15	1.20	1.25	1.25
Dundas, Ont.	.70	1.05	.90	.90	.90	.90
Greencastle, Ind.	1.30	1.25	1.05	1.05	.95	.95
Lannon, Wis.	.80	1.00	1.00	1.00	.90	.90
Linwood, Iowa	1.00	1.25	1.25	1.05	1.05	1.15
Northern New Jersey	1.30	.....	1.80	1.60	1.40	.....
River Rouge, Mich.	1.00	1.00	1.00	1.00	1.00	1.10
St. Vincent de Paul, P. Q.	.85	1.35@1.45	1.00@1.10	.95@1.00	.90	1.00
Stone City, Iowa	.75	.....	1.20†	1.10	1.05	.....
Toronto, Ont.	1.60	1.95	1.80	1.80	1.80	1.80
Waukesha, Wis.	.90	.90	.90	.90	.90	.90
Wisconsin Points	.50	1.00	.....	.90	.90	.....
Youngstown, Ohio	.....	.....	.....	1.50	1.60	1.60
SOUTHERN:						
Alderson, W. Va.	.50	1.60	1.60	1.50	1.40	1.20
Bridgeport, Texas	1.00	1.00@1.35	1.35	1.25	1.25	1.10
Cartersville, Ga.	1.65	1.65	1.65	1.15	1.15	1.35
El Paso, Texas	1.00	1.00	1.00	1.00	1.00	.....
Ft. Springs, W. Va.	.60	1.60	1.60	1.50	1.40	.....
Graysville, Ga.	1.00	.....	.85@1.10	.85@1.00	.85@1.00	.....
WESTERN:						
Atchison, Kans.	.25	2.00	2.00	2.00	2.00	1.60‖@1.80
Blue Spr'gs & Wymore, Neb.	.20	1.45	1.45	1.35@1.40	1.25@1.30	1.20
Cape Girardeau Mo.	1.35	.....	1.25	1.25	1.00	.....
Kansas City, Mo.	1.00	1.65	1.65	1.65	1.65	1.65

Crushed Trap Rock

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Branford, Conn.	.60	1.70	1.45	1.20	1.05	.....
Duluth Minn.	1.00	2.25	2.00	1.75	1.35	1.35
Dwight, Calif.	1.75	1.75	1.75	1.75	1.75	.....
Eastern Maryland	1.00	1.60	1.60	1.50	1.35	1.35
Eastern Massachusetts	.85	1.75	1.75	1.25	1.25	1.25
Eastern New York	.75	1.25	1.25	1.25	1.25	1.25
Eastern Pennsylvania	1.15	1.60	1.60	1.50	1.35	1.35
Minneapolis, Minn.	1.25	.....	2.25	2.00	1.75	.....
New Haven, Wallingford and Britain, Conn.	.60	1.70	1.45	1.20	1.05	1.05
Northern New Jersey	1.50	2.00	1.80	1.40	1.40	.....
Oakland and El Cerrito, Calif.	1.75	1.75	1.75	1.75	1.75	.....
San Diego, Calif.	.50@.75	1.80@1.90	1.60@1.80	1.35@1.55	1.35@1.55	1.25@1.45
Sheboygan, Wis.	1.00	1.10	1.10	1.10	1.10	.....
Springfield, N. J.	1.70	2.00	2.00	1.70	1.70	.....
Westfield, Mass.	.60	1.50	1.35	1.20	1.10	1.10

Miscellaneous Crushed Stone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Berlin, Utley and Red Granite, Wis.—Granite	1.50	1.60	1.35	1.25	1.25	1.00
Coldwater, N. Y.—Dolomite			1.50 all sizes			
Columbia, S. C.—Granite	1.50b	.....	2.00	1.75	1.60	.....
Eastern Penn.—Sandstone	1.30	1.55	1.50	1.50	1.30	1.30
Eastern Penn.—Quartzite	1.20	1.35	1.25	1.20	1.20	1.20
Lithonia Ga.—Granite	.75(c)	1.75	1.66	1.25	1.25	.....
Lohrville, Wis.—Granite	1.65	1.70	1.65	1.45	1.50	.....
Middlebrook, Mo.—Granite	3.00@3.50	.....	2.00@2.25	2.00@2.25	.....	1.25@2.00
Northern New Jersey (Basalt)	150	2.00	1.80	1.40	1.40	.....
Richmond, Calif. (Basalt)	.75*	.....	1.50*	1.50*	1.50*	.....

*Cubic yd. †1 in. and less. ‖Rip rap per ton; (a) Deliveries after April 1. (b) Dust out. (c) Sand.

Agricultural Limestone

(Pulverized)

Alton, Ill. — Analysis, 97% $CaCO_3$, 0.3% $MgCO_3$; 90% thru 100 mesh.. 6.00

Asheville, N. C. — Analysis, 57% $CaCO_3$, 39% $MgCO_3$; 50% thru 100 mesh; 200-lb. burlap bag, 4.00; bulk 2.75

Branchton, Penn. — 100% thru 20 mesh; 60% thru 100 mesh; 45% thru 200 mesh. (Less 50 cents commission to dealers) 5.00

Cape Girardeau, Mo.—Analysis, 93.5% $CaCO_3$, 3.5% $MgCO_3$; 90% thru 50 mesh 1.50

Cartersville, Ga. — Analysis, 68% $CaCO_3$, 32% $MgCO_3$; pulverized..... 3.00
50% thru 100 mesh..... 1.75

Chaumont, N. Y. — Pulverized limestone, bags, 4.00; bulk..... 2.50

Colton, Calif.—Analysis, 95% $CaCO_3$, 3% $MgCO_3$—all thru 20 mesh—bulk 4.00

Dundas, Ont., Can.—Analysis, 53.80% $CaCO_3$, 43.31% $MgCO_3$; 35% thru 100 mesh, 50% thru 50 mesh, 100% thru 10 mesh; bags, 4.75; bulk..... 3.00

Hillsville, Penn. — Analysis, 94% $CaCO_3$, 1.40% $MgCO_3$, 75% thru 100 mesh; sacks, $5.00; bulk..... 3.50

Jamesville, N. Y.—Analysis, 89.25% $CaCO_3$; 5.25% $MgCO_3$; pulverized, bags, 4.00; bulk..... 2.50

Knoxville, Tenn.—80% thru 100 mesh, bags, 3.95; bulk 2.70

Linville Falls, N. C.—Analysis, 57% $CaCO_3$, 39% $MgCO_3$; 50% thru 100 mesh; 200-lb. burlap bag, 4.00; bulk 2.75

Marblehead, Ohio — Analysis, 83.54% $CaCO_3$, 14.92% $MgCO_3$; 60% thru 100 mesh; 70% thru 50 mesh; 100% thru 10 mesh; 80 lb. paper sacks, 5.10; bulk 3.60

Marion, Va. — Analysis, 90% $CaCO_3$, 2% $MgCO_3$; 42.5% thru 100 mesh, 11.3% thru 80, 20.2% thru 60, 22.8% thru 40, 3.2% thru 20 and under or 75% thru 40 mesh; pulverized, per ton..... 2.00

Mayville, Wis.—Analysis, 54% $CaCO_3$, 44% $MgCO_3$; 90% thru 100 mesh.... 3.90@ 4.50

Mountville, Va.—Analysis 76.60% $CaCO_3$, 22.83% $MgCO_3$; 50% thru 100 mesh, 100% thru 20 mesh—125-lb. hemp bags..... 5.00

Osborne, Penn.—100% thru 20 mesh; 60% thru 100 mesh; 45% thru 200 mesh. (Less 50 cents commission to dealers) 5.00

Piqua, Ohio—Total neutralizing power 95.3%; 99% thru 10, 60% thru 50; 50% thru 100..... 2.50@ 2.75
100% thru 10, 90% thru 50, 80% thru 100; bags, 5.10; bulk..... 3.60
99% thru 100, 85% thru 200; bags, 7.00; bulk..... 5.50

Waukesha, Wis.—Pulverized 4.00

Watertown, N. Y.—Analysis, 96-99% $CaCO_3$; bags, 4.00; bulk..... 2.50

West Stockbridge and Rockdale, Mass., Danbury, Conn., North Powna, Vt. —Analysis, 90% $CaCO_3$, 5% $MgCO_3$; 50% thru 100 mesh; paper bags, 4.75; cloth, 5.25; bulk..... 3.25

Agricultural Limestone

(Crushed)

Alderson, W. Va. — Analysis, 90% $CaCO_3$; 90% thru 50 mesh..... 1.50

Alton, Ill. — Analysis, 97% $CaCO_3$, 0.3% $MgCO_3$; 50% thru 4 mesh.... 2.00

Bedford, Ind.—Analysis, 98½% $CaCO_3$, 1% $MgCO_3$; 90% thru 10 mesh 1.50

Bettendorf, Iowa — 97% $CaCO_3$, 2% $MgCO_3$; 50% thru 100 mesh; 50% thru 4 mesh..... 1.50

Blackwater, Mo.—77% $CaCO_3$; 100% thru 8 mesh, 25% thru 100 mesh.... 1.00

Bridgeport and Chico, Texas—Analysis, 94% $CaCO_3$, 2% $MgCO_3$; 100% thru 10 mesh 1.75
50% thru 4 mesh..... 1.50

(Continued on next page)

Agricultural Limestone

(Continued from preceding page)

Chicago, Ill.—50% thru 100 mesh; 90% thru 4 mesh	.80
Chico, Texas—100% thru 4 mesh	1.50
100% thru 10 mesh, bags, 5.00; bulk	2.00
Columbia, Krause, Valmeyer, Ill.—Analysis, 90% $CaCO_3$; 90% thru 4 mesh	1.15
Cypress, Ill.—50% thru 100 mesh	1.25
90% thru 50 mesh; 50% thru 50 mesh; 90% thru 4 mesh; 50% thru 4 mesh	1.15
Ft. Springs, W. Va.—Analysis, 90% $CaCO_3$; 90% thru 50 mesh	1.50
Garrett, Okla.—All sizes	1.25
Kansas City, Mo.—50% thru 100 mesh	1.25
Lannon, Wis.—Analysis, 54% $CaCO_3$, 44% $MgCO_3$; 99% through 10 mesh; 46% through 60 mesh	2.00
Screenings (¼ in. to dust)	1.00
Marblehead, Ohio.—Analysis, 83.54% $CaCO_3$, 14.92% $MgCO_3$, 32% thru 100 mesh; 51% thru 50 mesh; 83% thru 10 mesh; 100% thru 4 mesh (meal) bulk	1.60
Mayville, Wis.—Analysis, 54% $CaCO_3$, 44% $MgCO_3$; 50% thru 50 mesh	1.85@ 2.35
Middlepoint, Bellevue, Kenton, Ohio; Monroe, Mich.; Huntington and Bluffton, Ind. — Analysis, 42% $CaCO_3$, 54% $MgCO_3$; meal, 25 to 45% thru 100 mesh	1.60
Milltown, Ind. — Analysis, 94.41% $CaCO_3$, 2.95% $MgCO_3$; 30.8% thru 100 mesh, 38% thru 50 mesh	1.45@ 1.60
Moline, Ill.—97% $CaCO_3$, 2% $MgCO_3$ —50% thru 100 mesh; 50% thru 4 mesh	1.50
Pixley, Mo.—Analysis, 96% $CACO_3$; 50% thru 50 mesh	1.25
50% thru 100 mesh; 90% thru 50 mesh; 50% thru 50 mesh; 90% thru 4 mesh; 50% thru 4 mesh	1.65
River Rouge, Mich.—Analysis, 54% $CaCO_3$, 40% $MgCO_3$; bulk	.80@ 1.40
Stone City, Iowa. — Analysis, 98% $CaCO_3$; 50% thru 50 mesh	.75
Waukesha, Wis.—Test, 107.38% bone dry, 100% thru 10 mesh; bags, 2.85; bulk	2.10

Pulverized Limestone for Coal Operators

Hillsville, Penn., sacks, 4.50; bulk	3.00
Piqua, Ohio, sacks, 4.50@5.00 bulk	3.00@ 3.50
Waukesha, Wis.—Bulk	4.00

Miscellaneous Sands

Silica sand is quoted washed, dried and screened unless otherwise stated. Prices per ton.

Glass Sand:	
Berkeley Springs, W. Va.	2.00@ 2.25
Cedarville and S. Vineland, N. J.—Damp	1.75
Dry	2.25
Cheshire, Mass: 6.00 to 7.00 per ton; bbl.	2.50
Columbus, Ohio	1.25@ 1.50
Estill Springs and Sewanee, Tenn.	1.50
Grays Summit and Klondike, Mo.	2.00
Los Angeles, Calif.—Washed	5.00
Mapleton Depot, Penn.	2.00@ 2.25
Massillon, Ohio	3.00
Ohlton, Ohio	2.50
Ottawa, Ill.—Chemical and mesh guaranteed	1.50
Pacific, Mo.	2.25@ 3.00
Pittsburgh, Penn.—Dry	4.00
Damp	3.00
Red Wing, Minn.: Bank run	1.50
Ridgway, Penn.	2.50
Rockwood, Mich.	2.75@ 3.25
Round Top, Md.	2.25
San Francisco, Calif.	4.00@ 5.00
St. Louis, Mo.	2.00
Sewanee, Tenn.	1.50
Thayers, Penn.	2.50
Zanesville, Ohio	2.50
Miscellaneous Sands:	
Aetna, Ind.: Core, Box cars, net, .35; open-top cars	.30
Albany, N. Y.: Core	1.50
Molding fine, brass molding	2.25
Molding coarse	2.00
Sand blast	3.50
Arenzville and Tamalco, Ill.: Molding fine and coarse	1.40@ 1.60
Brass molding	1.75
Beach City, Ohio: Fine core	1.75
Furnace bottom	2.50

(Continued on next page)

Wholesale Prices of Sand and Gravel

Prices given are per ton, f. o. b. producing plant or nearest shipping point

Washed Sand and Gravel

City or shipping point	Fine Sand, 1/10 in. down	Sand, ¼ in. and less	Gravel, ½ in. and less	Gravel, 1 in. and less	Gravel, 1½ in. and less	Gravel, 2 in. and less
EASTERN:						
Ambridge & So. H'g'ts, Penn.	1.25	1.25	1.15	.85	.85	.85
Buffalo, N. Y.	1.10	.95	.85			
Erie, Penn.		1.25		1.50	1.75	
Farmingdale, N. J.	.58	.48	1.05	1.20	1.10	
Leeds Jct., Maine		.50	1.75		1.35	1.25
Machias Jct., N. Y.		.75	.75	.75	.75	.75
Montoursville, Penn.	1.00	1.10	1.25	1.00	.90	.80
Northern New Jersey		.50	1.25	1.25	1.25	
Olean, N. Y.		.90	.75	.75	.75	.75
Pittsburgh, Penn., and vicinity	1.25	1.25	1.05	1.05	.85	.85
Shining Point, Penn.			1.00	1.00	1.00	1.00
Washington, D. C.—Rewashed, river	.85	.85	1.70	1.50	1.30	1.30
CENTRAL:						
Attica, Ind.	.75	.75	.75	.75	.75	75
Barton, Wis.		.60	.80	.80	.80	
Chicago, Ill.	1.35	1.75	1.75	1.75	1.75	1.75
Columbus, Ohio	.75	.75@1.00	.75	.75@1.00	.75@1.00	.75
Covington, Ind.	.75	.75	.75	.75	.75	.75
Des Moines, Iowa	.50	.40	1.50	1.50	1.50	1.50
Eau Claire, Wis.		.40	.85@1.25		.85	
Elkhart Lake, Wis.	.65	.60	.62	.62	.62	.62
Ft. Dodge, Iowa		2.05	2.05	2.05	2.05	2.05
Ft. Worth, Texas	2.00	2.00	2.00	2.00	2.00	2.00
Grand Rapids, Mich.		.50		.80	.70	.70
Hamilton, Ohio		1.00			1.00	
Hersey, Mich.		.50		.80		.70
Indianapolis, Ind.	.60	.60		.90	.75@1.00	.75@1.00
Janesville, Wis.		.65@ .75			.65@ .75	
Mason City, Iowa	.45@ .55	.45@ .55	1.35@1.45	1.45@1.55	1.40@1.50	1.35@1.45
Mankato, Minn.		.40	1.25a		1.25	
Milwaukee, Wis.		1.01	1.21	1.21	1.21	1.21
Minneapolis, Minn.*	.35	.35	1.35	1.25	1.25	1.25
Northern New Jersey	.45@ .50	.45@ .50		1.25	1.25	
Palestine, Ill.	.75	.75	.75	.75	.75	.75
St. Louis, Mo., f. o. b. cars	1.18	1.45	1.65§	1.45		1.45§
Silverwood, Ind.	.75	.75	.75	.75	.75	.75
Summit Grove, Ind.	.75	.75	.75	.75	.75	.75
Terre Haute, Ind.	.75	.60	.90	.90	.90	.85
Wolcottville, Ind.	.75	.75	.75	.75	.75	.75
Waukesha, Wis.		.45	.55	.60	.65	.65
Winona, Minn.	.40	.40	1.25	1.10	1.00	1.00
Yorkville, Sheridan, Oregon, Moronts, Ill.			Average .40@.60			
Zanesville, Ohio	.70	.60		.60	.90	.90
SOUTHERN:						
Brookhaven, Miss., Roseland La.	1.75*	.70	2.25	1.50	1.25	
Charleston, W. Va.	All sand 1.40 f.o.b. cars.			All gravel 1.50 f.o.b. cars.		
Chehaw, Ala.	00@ .30		.40	.50		
Estill Sp'gs & Sewanee, Tenn.	1.00	.90	1.00	1.00	.85	.85
Knoxville, Tenn.	1.00	1.00	1.20	1.20	1.20	1.20
Macon and Gaillaro, Ga.	.50	.50		.60	.65	.65
New Martinsville, W. Va.	.90	.90				.90
Roseland, La.	.60	.50	2.25	1.25	1.25	1.50
Smithville, Texas		.90	.90	.90	.90	.75
WESTERN:						
Baldwin Park, Calif.	.20	.20	.40	.50	.50	
Kansas City, Mo.	.80	.70				
Los Angeles, Calif.	.50	.50	.92	.92	.92	
Pueblo, Colo.	1.10*	.90*		1.60*		1.50*
San Diego, Calif.	.50	.50	1.20	1.20	1.00	1.00
Seattle, Wash. (bunkers)	1.50*	1.50*	1.50*	1.50*	1.50*	1.50*

Bank Run Sand and Gravel

City or shipping point	Fine Sand, 1/10 in. down	Sand, ¼ in. and less	Gravel ½ in. and less	Gravel, 1 in. and less	Gravel, 1½ in. and less	Gravel, 2 in. and less
Boonville, N. Y.	.60@ .80		.55@ .75			1.00
Brookhaven, Miss., Rosel'd, La.	Road gravel, ballast gravel .60 a ton					
Chehaw, Ala.	00@ .30					
Des Moines, Iowa	Washed, .65; unwashed, .40 (not screened)					
Dudley, Ky. (crushed silica)	1.10	1.10		.95		
East Hartford, Conn.	Sand, .65 per cu. yd.					
Elkhart Lake, Wis.	.50					
Gainesville, Texas		.95				.5[illegible]
Grand Rapids, Mich.				.60		
Hamilton, Ohio					.70	
Hersey, Mich.				.55		
Indianapolis, Ind.	Mixed gravel for concrete work, .65					
Lindsay, Texas						.55
Macon and Gaillaro, Ga.		.35				
Mankato, Minn.	Pit run gravel, .50					
Moline, Ill. (b)	.60	.60	Concrete gravel, 50% G., 50% S., 1.00			
Montezuma, Ind.						.60
St. Louis, Mo.	Mine run gravel 1.55 per ton					
Shining Point, Penn.	Concrete sand, 1.10 ton					
Smithville, Texas	.50	.50	.50	.50	.50	.50
Summit Grove, Ind.	.50	.50	.50	.50	.50	.50
Waukesha, Wis.	.60	.60	.60	.60	.60	.60
Winona, Minn.	.60	.60	.60	.60	.60	.60
York, Penn.	1.10					
Zanesville, Ohio		.60				

*Cubic yd.; (a) ¾ in. and less; (b) river run.

Miscellaneous Sands

(Continued from preceding page)

Molding fine and coarse		2.00
Traction unwashed and screened		1.75
Cheshire, Mass.—Furnace lining, molding fine and coarse		5.00
Sand blast	5.00@	8.00
Stone sawing		6.00
Columbus, Ohio:		
Core	.30@	.50
Furnace lining, molding coarse	2.00@	2.25
Molding fine	2.50@	2.75
Sand blast	4.00@	4.50
Stone sawing		1.50
Traction	.50@	.75
Brass molding	2.50@	3.00
Dresden, Ohio:		
Core	1.25@	1.50
Molding fine	1.50@	1.75
Molding coarse		1.50
Traction		1.25
Brass molding		1.75
Dunbar, Penn.:		
Traction (damp)		2.00
Eau Claire, Wis.:		
Sand blast	3.00@	3.25
Roofing sand		4.25
Traction	.40@	.65
Elco, Ill.:		
Ground silica per ton in carloads	22.00@	31.00
Estill Springs and Sewanee, Tenn:		
Molding fine and core		1.25
Roofing sand, sand blast, traction	1.35@	1.50
Franklin, Penn.:		
Core		2.00
Molding coarse and fine		1.75
Grays Summit and Klondike, Mo.:		
Molding fine, core and stone sawing	1.75@	2.00
Joliet, Ill.:		
No. 2 molding sand; also loam for luting purposes and open-hearth work	.65@	.85
Klondike, Mo.:		
Molding fine	1.75@	2.00
Mapleton Depot, Penn.:		
Molding fine, traction and blast		2.00
Roofing sand		2.25
Massillon, Ohio:		
Molding fine, coarse, furnace lining core and traction		2.50
Michigan City, Ind.:		
Core and traction	.30@	.40
Montoursville, Penn.:		
Core	1.35@	1.50
Traction	1.00@	1.10
New Lexington, Ohio:		
Molding fine		2.50
Molding coarse		2.25
Ohlton, Ohio:		
Core and sand blast, both green		2.00
Roofing sand, furnace lining, molding fine and coarse, stone sawing, traction, all green		1.75
Add 50c a ton for green sand dried.		
Oceanside, Calif.:		
Roofing sand (stucco)	3.00@	3.40
Ottawa, Ill.:		
Sand blast		3.50
Stone sawing		1.50
Pacific, Mo.:		
Core, furnace lining	1.00@	1.25
Molding fine	.90@	1.00
Stone sawing	1.00@	1.75
Molding coarse	.85@	1.00
Red Wing, Minn.:		
Core, furnace lining, stone sawing		1.50
Molding fine and coarse, traction		1.25
Sand blast		3.50
Filter sand		3.75
Ridgway, Penn.:		
Core		2.00
Furnace lining, molding fine, molding coarse		1.25
Traction		2.25
Round Top, Md.:		
Core		1.60
Traction, damp		1.75
Roofing and blast sand		2.25
St. Louis, Mo.:		
Core	1.00@	1.75
Furnace lining		1.50
Molding fine	1.50@	2.50

Crushed Slag

City or shipping point	Roofing	¼ in. down	½ in. and less	¾ in. and less	1½ in. and less	2½ in. and less	3 in. and larger
EASTERN:							
Buffalo, N. Y.	2.35	1.35	1.35	1.35	1.35	1.35	1.35
E. Canaan, Conn.	3.00	1.00	2.25	1.25	1.25	1.15	1.15
Eastern Penn. and Northern N. J.	2.50	1.20	1.50	1.20	1.20	1.20	1.20
Emporium and Du Bois, Penn.		1.35	1.35	1.35	1.35	1.35	1.35
Reading, Pa.	2.50	1.00		1.25			
Western Penn.	2.50	1.25	1.50	1.25	1.25	1.25	1.25
CENTRAL:							
Ironton, Ohio	2.05	1.45	1.65	1.45		1.45	
Jackson, Ohio		1.05		1.30	1.05	1.30	1.30
Toledo, Ohio	1.50	1.25	1.25	1.25	1.25	1.25	1.25
Youngst'n, O., dist.	2.00	1.25	1.35	1.35	1.25	1.25	1.25
SOUTHERN:							
Ashland, Ky.	2.25	1.55		1.55	1.55	1.55	
Ensley and Alabama City, Ala.	2.05	.80	1.25	1.15	.90	.90	.80
Longdale, Roanoke, Ruesens, Va.	2.50	1.00	1.25	1.25	1.25	1.15	1.15

Lime Products (Carload Prices Per Ton F.O.B. Shipping Point)

	Finishing hydrate	Masons' hydrate	Agricultural hydrate	Chemical hydrate	Ground burnt lime, Blk.	Ground burnt lime, Bags	Lump lime, Blk.	Lump lime, Bbl.
EASTERN:								
Berkeley, R. I.			12.00					2.20
Buffalo, N. Y.		12.00	12.00	12.00				
Lime Ridge, Penn.							5.00a	
West Stockbridge, Mass.		10.50	5.60					2.25m
Williamsport, Penn.			10.00				6.00	
York, Penn.		10.50	10.50	11.50			8.50	1.65i
CENTRAL:								
Cold Springs, Ohio		10.00	9.00		9.00	11.00	9.00	
Delaware, Ohio	12.50	10.00	9.00	10.50			9.00	1.50
Gibsonburg, Ohio	12.50				9.00	11.00	9.00	
Huntington, Ind.	12.50@14.50	10.00	9.00		9.00	11.00	9.00	
Luckey, Ohio (f)	12.50							
Marblehead, Ohio		10.00	9.00				9.00	1.50c
Marion, Ohio		10.00	9.00				9.00	1.70
Mitchell, Ind.		12.00	12.00	12.00	11.00		10.00	1.70e
Sheboygan, Wis.							9.50	
Tiffin, Ohio					9.00			
White Rock, Ohio	12.50							
Woodville, Ohio	12.50f	10.00f	9.00f		9.00	10.50f	9.00	1.50f
SOUTHERN:								
Erin, Tenn.							7.80	1.25
El Paso, Texas							9.00	2.00
Graystone & Wilmag, Ala.	12.50	11.00		8.50			8.50	1.50
Karo, Va.		10.00	9.00				7.00g	1.65h
Knoxville, Tenn.	20.00	11.00		11.00		1.35	8.50	1.50
Varnons, Ala. (f)		10.00p	10.00p				8.00q	1.40r
Zuber and Ocala, Fla.	14.00	12.00	10.00				12.00	1.70
WESTERN:								
Kirtland, N. M.							15.00	
San Francisco, Calif.	20.00†	20.00†	15.00s	20.00†				2.50o
Tehachapi, Calif.							16.20	

†50-lb. paper bags; (a) run of kilns; (c) wooden, steel 1.70; (d) wood; (e) wood bbl., $2.20 drum in steel; (f) dealers' prices; (g) to 9.50; (h) to 1.75; (i) 200 lb. bbl.; 2.65, 300 lb. bbl.; (l) bags; (m) finishing lime, 3.00 common; (n) common lime; (o) high calcium; (p) to 11.00; (q) to 8.50; (r) to 1.50; (s) in 125-lb. burlap sacks.

Miscellaneous Sands

(Continued)

Molding coarse	1.25@	1.75
Roofing sand		1.75
Sand blast	3.50@	4.50
Stone sawing	1.25@	2.25
Traction		1.25
Brass molding	2.00@	3.00
San Francisco, Calif:		
(Washed and dried) — Core, sand blast and brass molding	3.50@	5.00
Furnace lining and roofing sand	3.50@	4.50
Molding fine and traction		3.50
Molding coarse		4.50
(Direct from pit)—Core and molding fine	2.50@	4.50
Sewanee, Tenn.:		
Molding fine and coarse, roofing sand, sand blast, stone sawing, traction, brass molding		1.25
Tamms, Ill.:		
Ground silica per ton in carloads	20.00@	31.00
Thayers, Penn.:		
Core		2.00
Molding fine and coarse		1.25
Traction		2.25
Utica, Ill.:		
Core and furnace lining		.70
Molding fine		.60
Molding coarse		.65
Utica, Penn.:		
Core		2.00
Molding fine and coarse		1.75
Warwick, Ohio.:		
Core, molding coarse (green) 2.00; (dry) 2.50; traction		2.50
Zanesville, Ohio:		
Core, molding coarse, brass molding		2.25
Furnace lining		2.00
Traction		2.50
Molding fine		2.75

Talc

Prices given are per ton f.o.b. (in carload lots only), producing plant, or nearest shipping point

Baltimore, Md.:		
Crude talc (mine run)	3.00@	4.00
Ground talc (20-50 mesh), bags		10.00
Cubes		55.00
Blanks (per lb.)		.08
Pencils and steel workers' crayons, per gross		1.25
Chatsworth, Ga.:		
Crude (for grinding)		6.00
Ground (150-200 mesh) 200 lb. bags		15.00
Pencils and steel workers' crayons, per gross	1.25@	2.50
Chester, Vt.:		
Ground (150-200 mesh)	10.00@	10.50
(Bags extra, returnable)		
Chicago, Ill.:		
Ground (150-200 mesh) bags		30.00
E. Granville, Rochester, Johnson, Waterbury, Vt.:		
Ground talc (20-50 mesh) bags	7.00@	10.00
Ground talc (150-200 mesh) bags	10.00@	25.00
Pencils and steel workers' crayons, per gross	.75@	2.00
Emeryville, N. Y.:		
(Double air floated) including bags; 325 mesh (50 lb. paper, 100 & 200 lb. burlap bags)		14.75
Hailesboro, N. Y.:		
Ground (150-200 mesh) bags		18.00
Ground (200-300 mesh) bags		20.00
Henry, Va.:		
Crude talc (mine run) per 2000-lb. ton	2.75@	3.50
Ground (150-200 mesh), bags	9.00@	14.00
Joliet, Ill.		
Ground (200 mesh), bags		30.00
Keeler, Calif.:		
Ground (200-300 mesh), bags	20.00@	30.00
Marshall, N. C.:		
Crude	4.00@	8.00
Ground (20-50 mesh), bags extra	6.50@	8.50
Ground (150-200 mesh), bags	8.00@	12.00
Natural Bridge, N. Y.:		
Ground talc (300-325 mesh), bags		13.00

Rock Phosphate

Prices given are per ton (2240-lb.) f.o.b. producing plant or nearest shipping point.

Lump Rock

Gordonsburg, Tenn.—B.P.L. 68-72%	4.00@	5.00
Mt. Pleasant, Tenn.—B.P.L. 75%		6.50
75% hand mined		6.50
75% (free of fines for furnace use)		6.75
75% max. 5½% I and A	6.50@	7.00
78% max. 4½% I and A		8.00
72% B.P.L.	5.50@	6.00
Tennessee—F. O. B. mines, gross ton, unground Tenn. brown rock, 72% min. B.P.L.		5.50
Twomey, Tenn.—B.P.L. 65%, 2000 lb.	7.00@	8.00

(Continued on next page)

Roofing Slate

The following prices are per square (100 sq. ft.) for Pennsylvania Blue-Clay Roofing Slate, f. o. b. cars quarries:

Sizes	Genuine Bangor, Washington Big Bed, Franklin Big Bed	Genuine Albion	Slatington Small Bed	Genuine Bangor Ribbon
24x12, 24x14	10.20	10.00	8.10	7.80
22x12	10.80	10.00	8.40	8.75
22x11	10.80	10.50	8.40	8.75
20x12	12.60	10.50	8.70	8.75
20x10, 18x10, 18x9, 18x12	12.60	11.00	8.70	8.75
16x10, 16x9, 16x8, 16x12	12.60	11.00	8.40	8.75
14x10	11.10	11.00	8.10	7.80
14x8	11.10	10.50	8.10	7.80
14x7 to 12x6	9.30	10.50	7.50	7.80
	Mediums	Mediums	Mediums	Mediums
24x12	$ 8.10	$8.10	$7.20	$5.75
22x11	8.40	8.40	7.50	5.75
Other sizes	8.70	8.70	7.80	5.75

For less than carload lots of 20 squares or under, 10% additional charge will be made.

(Continued from preceding page)

Ground Rock

(2000 lb.)

Centerville, Tenn.—B.P.L. 65%	7.00
Gordonsburg, Tenn.—B.P.L. 68-72%..	4.00@ 5.00
Mt. Pleasant, Tenn. — B.P.L. 65% 95% thru 100 mesh	7.00
13% phosphorus, 95% thru 80 mesh	5.75
Twomey, Tenn.—B.P.L., 65%	7.00@ 8.00

Florida Phosphate

(Raw Land Pebble)

Per Ton

Florida—F. O. B. mines, gross ton, 68/66% B.P.L., Basis 68%	2.25
70% min. B.P.L., Basis 70%	2.50
72% min. B.P.L., Basis 72%	2.75
75/74% B.P.L., Basis 75%	3.75

Fluorspar

Fluorspar—80% and over calcium fluoride, not over 5% silica; per ton f.o.b. Illinois and Kentucky mines	18.00@19.00
Fluorspar—85% and over calcium fluoride, not over 5% silica; per ton f.o.b. Illinois and Kentucky mines	19.00@21.00
Fluorspar, foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Philadelphia, duty paid, per gross ton	18.00

Special Aggregates

Prices are per ton f. o. b. quarry or nearest shipping point.

City or shipping point	Terrazzo	Stucco chips
Barton, Wis., f.o.b. cars		10.50
Brandon, Vt.—American Botticino	9.00‡	9.00‡
Coral pink	9.00‡	9.00‡
Chicago, Ill.—Stucco chips, in sacks f.o.b. quarries		17.50
Crown Point, N. Y.—Mica Spar		8.00@10.00
Easton, Penn., and Phillipsburg, N. J.— Slate granules		6.00@ 6.50
Royal and creme green		15.00
Evergreen		10.00
Haddam, Conn. — Felstone buff	15.00	15.00
Harrisonburg, Va.—Blk marble (crushed, in bags	†12.50	†12.50
Ingomar, Ohio (in bags)		4.00@18.00
Middlebrook, Mo.—Red		20.00@25.00
Milwaukee, Wis.		14.00@34.00
Newark, N. J.—Roofing granules		7.50
New York, N. Y.—Red and yellow Verona		32.00
Poultney, Vt.		6.12
Red Granite, Wis.		7.50
Sioux Falls, S. D.	7.50	7.50
Stockton, Cal. — "Natrock" roofing grits		12.00
Tuckahoe, N. Y.		12.00
Villa Grove, Colo.		13.00
Wauwatosa, Wis.		16.00@45.00

†C.L. Less than C. L., 15.50.
‡Plus 2.00 per ton for bags.

Concrete Brick

Prices given per 1000 brick, f.o.b. plant or nearest shipping point.

	Common	Face
Appleton, Minn.	22.00	28.00@35.00
Baltimore, Md. (Del. according to quantity)	16.00@16.50	22.00@50.00
Ensley, Ala. ("Slagtex")	12.50	22.50@33.50
Eugene, Ore.	25.00	35.00@75.00
Friesland, Wis.	22.00	32.00
Milwaukee, Wis.	14.00	30.00@42.00
Omaha, Neb.	18.00	30.00@40.00
Philadelphia, Penn.	15.00	21.00
Portland, Ore.	19.00	25.00@45.00
Prairie Du Chien, Wis.	14.00	25.00@33.00
Puyallup, Wash.	20.00	30.00@90.00
Rapid City, S. D.	18.00	25.00@45.00
Salem, Ore.	23.00	90.00@100.00
Watertown, N. Y.	18.00@21.00	35.00@37.50
Wauwatosa, Wis.	14.00@18.00	30.00@42.00

Sand-Lime Brick

Prices given per 1000 brick f. o. b. plant or nearest shipping point, unless otherwise noted.

Barton, Wis.	10.50
Boston, Mass.	14.00@15.50
Brighton, N. Y.	16.75
Dayton, Ohio	12.50@13.50
Grand Rapids, Mich. (wholesale)	10.00
Jackson, Mich.	13.00
Lancaster, N. Y.	13.00
Michigan City, Ind.	11.00
Milwaukee, Wis.	13.00
Plant City, Fla.	11.00@15.00
Portage, Wis.	15.00
Rochester, N. Y. (del. on job)	19.75
Saginaw, Mich.	13.00
San Antonio, Texas	13.00@13.50
Syracuse, N. Y.	16.00@18.00
Wilkinson, Fla. (white and buff)	11.00@16.00

Gray Klinker Brick

El Paso, Texas	13.00

Lime

Warehouse prices, carload lots at principal cities.

	Hydrated, per ton Finishing	Common
Atlanta, Ga.	22.50	14.00
Baltimore, Md.	24.25	17.85
Boston, Mass.	20.00	15.00
Cincinnati, Ohio	16.80	14.30
Chicago, Ill.	20.00	
Dallas, Tex.	20.00	
Denver, Colo.	24.00	
Detroit, Mich.	16.00	
Minneapolis, Minn. (white)	23.00	21.00
Montreal, Que.		21.00
New York, N. Y.	18.20	12.00@13.10
Philadelphia, Penn.	23.00	16.00
St. Louis, Mo.	24.00	20.00
San Francisco, Calif.	22.00	
Seattle, Wash. (paper sacks)	24.00	

Portland Cement

Prices per bag and per bbl. without bags net in carload lots.

	Per Bag	Per Bbl.
Albany, N. Y.		2.62
Atlanta, Ga.		2.35
Boston, Mass.	.63	2.53@2.63
Buffalo, N. Y.	.60	2.38@2.48†
Cedar Rapids, Iowa		2.44
Cincinnati, Ohio		2.47
Cleveland, Ohio		2.39
Chicago, Ill.		2.20
Columbus, Ohio		2.44
Dallas, Texas	.53¾	2.15
Davenport, Iowa		2.39
Dayton, Ohio		2.48
Denver, Colo.	.63¾	2.55
Detroit, Mich.		2.35
Duluth, Minn.		2.19
Indianapolis, Ind.		2.41
Kansas City, Mo.	.51¾	2.07
Los Angeles, Cal. (less 5c dis.)	.60	2.60
Louisville, Ky.		2.45
Memphis, Tenn.		2.60
Milwaukee, Wis.		2.35
Minneapolis, Minn.		2.42
Montreal, Canada (sks. 20c ext.)		1.90a
New Orleans, La.		2.40
New York, N. Y.	.54	2.15
Peoria, Ill.		2.37
Philadelphia, Penn.	.58	2.31@2.41
Phoenix, Ariz.	.82½	3.65
Pittsburgh, Penn.		2.19
Portland, Ore.		3.05
San Francisco, Calif.	.65¼	2.71*
St. Louis, Mo.	.57½	2.30
St. Paul, Minn.		2.42
Seattle, Wash. (10c bbl. dis.)		2.65
Toledo, Ohio		2.40

NOTE—Add 40c per bbl. for bags.
*Including sacks at 10c each.
†Prices to contractors, including bags.
(a) Less 10c 20 days.

Mill prices f.o.b. in carload lots, without bags, to contractors.

	Per Bag	Per Bbl.
Buffington, Ind.		1.95
Concrete, Wash.		2.60
Dallas, Texas	.52½	
Fordwick, Va.		2.05
Hannibal, Mo.		2.05
Hudson, N. Y.		2.05
Kingsport, Tenn.		2.05
Leeds, Ala.		1.95
Louisville, Ky.	.64¾	2.45
Nazareth, Penn.		1.95
Northampton, Penn.		1.95
Seattle, Wash.		2.35
Steelton, Minn.		2.00
Universal, Penn.		1.95

Cement Products

Hawthorne tile, carload lots, f. o. b. plant.

	Cicero, Ill. Per sq.	Ft. Worth, Tex. Per sq.
Silver gray		8.00
Red French	9.50	9.00
Green French	11.50	10.00
Red Spanish	10.00	9.00
Green Spanish	12.00	10.00

	—Cicero— Red	Green	—Ft. Worth— Gray	Red	Green
Ridges	.25	.35	.25	.25	.30
Hips	.20	.30	.14	.14	.17
Ridge closers	.05	.06	.06	.06	.06
Hip terminals, 3 way	1.25	1.50	1.00	1.00	1.25
Hip starters	.50	.60	.22	.22	.25
Gable finials	1.25	1.50	1.00	1.00	1.25
Gable starters	.20	.30	.14	.14	.16
End bands	.20	.30			
Eave closers	.06	.08	.06	.06	.06

Gypsum Products—CARLOAD PRICES PER TON AND PER M SQUARE FEET, F. O. B. MILL

	Crushed Rock	Ground Gypsum	Agricultural Gypsum	Stucco Calcined Gypsum	Cement and Gauging Plaster	Wood Fiber	White Gauging	Sanded Plaster	Keene's Cement	Trowel Finish	—Plaster Board— ¼x32x36" Weight 1500 lb. Per M Sq. Ft.	⅜x32x36" Weight 1850 lb. Per M Sq. Ft.	Wallboard, ⅜x32 or 48" Lengths 6'-10', 1850 lb. Per M Sq. Ft.
Douglas, Ariz.			7.00		16.50		19.50			15.50			
Grand Rapids, Mich.	2.50*		6.00	9.00	9.00‖	9.00†							
Hanover, Mont.				11.80									
Port Clinton, Ohio	3.00	4.00	6.00	10.00	9.00	9.00	21.00	7.00	30.15	20.00		20.00	30.00
Portland, Colo.				10.00									
Winnipeg, Man.	5.50	5.50	7.00	13.50	15.00	15.00					28.50		34.00

NOTE—Returnable Bags, 10c each; Paper Bags, 1.00 per ton extra (not returnable).
*To 3.00; †to 11.00; ‖to 12.00.

New Machinery and Equipment

New Revolving Type Steam Shovel

A STEAM shovel has been placed on the market by The Russell & Co., Massilon, Ohio, which will be sold under the trade name of "Massilon." The machine is of the revolving type, equipped with crawler tread and ¾-yd. bucket.

The shovel's revolving frame is a one-piece, open-hearth annealed steel casting upon which is mounted the hoisting and swinging machinery, boiler and boom. Due to this feature, the manufacturers claim, an unusually rugged construction is afforded which eliminates the possibility of crystallization and breakage of the main I-beams, as is sometimes experienced in the structural built-up style of construction. The center king pin and the vertical swing shaft are bronze bushed. The front end of the frame is provided with heavy lugs for the attachment of either clamshell or dipper boom. The bronze-bushed conical rollers of high-carbon annealed cast steel are 16 in. in diameter and are mounted on stationary shafts in the main casting. They are interchangeable and adjustable and can be removed without jacking up the main frame.

The Newest Member of the Steam-Shovel Family

An important feature of the new shovel is that its roller path and swing gear are separate units, thus affording a saving on repairs, as both parts do not wear in the same proportion. The company claims that the machine's roller path is larger than that of any other ¾-yd. shovel now manufactured. It is centered loosely on the frame and is not cast integral with the swing gear. A small, but exclusive feature is that all holding-down bolts on the shovel are of one diameter and length.

Crawler Construction

The crawlers are 24 in. wide and are fastened by 1¾-in. hinge pins. They extend but a short distance beyond the frame so that digging can be accomplished equally well from either end. Power for traveling is arranged for two speeds and is received from the longitudinal propelling shaft under the truck frame through bevel gears to the driving axle, on each end of which are mounted the driving tumblers. The driving tumblers, with link teeth on the sides and large diameter jaw clutch, are of a self-cleaning type, thus eliminating the crushing of rocks and earth as the links pass around the tumblers. There are no gaps between the links and all bearings are high out of mud and water.

Steering is done entirely from the cab, no pitmen being needed to connect chains to revolving body or to throw clutches. The operator needs only to throw a lever and the revolving frame is locked stationary to the truck frame, thus causing no movement of the revolving body. This, it is claimed, allows the machine to steer easily in close quarters and eliminates the hazard of damaging the rear end of housing. This exclusive feature makes possible move-ups without the necessity of connecting steering gear.

The standard boom is 18 ft. long, but can be made in any length desired. The main members are of white oak armoured with heavy full-length steel plates outside. The rack and rackings pinions are of manganese steel. Ladder is provided on side of boom. The manufacturers claim that the machine's dipper is the largest of any ¾-yd. revolving shovel and that two dippersfull completely fill a 1½-yd. car or truck. The dipper is furnished with manganese reversible point teeth, riveted outside.

Hoisting Engines

The hoisting, boom and swinging engines are of the double horizontal type, the cylinders of which are of close-grained iron, with front heads cast integral. The rear heads are accurately machined and ground to steam joint, eliminating the need for gaskets. The pistons are cast in one piece, cored, cast iron and fitted with three packing rings. Connecting rods are of manganese bronze, having a tensile strength of from 70,000 to 80,000 lb. per sq. in. Their ends have wedge adjustments and are interchangeable with all connecting rods in all engines on the machine. The cylinders and valves are lubricated by force feed from a four-feed oil pump through copper tubing.

The boiler is of the vertical fire tubular type, is constructed of fire-box steel and is 48¾ in. in diameter by 97 in. high. It is equipped with 2-in. pop valve, set to blow at 135 lb. Water supply is by a duplex boiler feed pump and injector, each feed line entering at a different place in the boiler. Steam syphon is furnished for filling water tank and a 1-in. pipe is taken through rotating center shaft so that the tank can be filled while the shovel is in operation.

Large Size Conveyor Belt Tripper

THE Stearns Conveyor Co., material handling and equipment manufacturers of Cleveland, have just completed and shipped to the Peerless Portland Cement Co., of Detroit, one of the largest portable trippers of the kind ever built. It is to be used in connection with the cement company's operations in the Michigan City plant and also on jobs to be cared for at their plant now being erected in Detroit.

The tripper is of steel frame, with a

A 54-in. belt tripper ready for shipment

54-in. by 610 in. long belt equipment. The tripper will handle 2,500 tons of crushed stone per hour, according to Earl Stearns, president of the conveyor company.

The machine is driven by enclosed cut tooth gears. It provides an innovation in this style of equipment which insures starting and stopping without jar, through the use of the clutch of the automobile type.

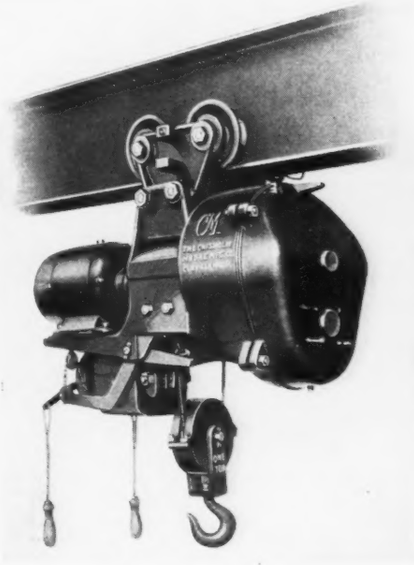
The tripper is of the automatic self-propelling and reversing type. Special brushes have been provided on this job, so that there is no danger of damp crushed stone accumulating on the belt or in any way doing damage to the machine.

New Electric Hoist

THE essential mechanism of the new C-M electric hoist designed and manufactured by the Chisholm-Moore Manufacturing Co., Cleveland, Ohio, consists of a standard enclosed crane motor with an automatic control brake, enclosed drum type controller, which operates the motor brake, two reductions of spur gears, winding drum and hook block. These parts are of very simple design and can be quickly and easily disassembled for inspection and repair.

The accompanying picture gives a fair idea of the general design of the C-M hoist. More detailed description of its different types and their possible modifications is given in the company's bulletin No. 20.

The hoist with plain and hand geared trolley, as shown, is made with capacities from 500 to 4000 lb.



New electric hoist

New Stake Body for Ford Truck for General Plant Utility Purposes

THE Ford Motor Co., Detroit, Mich., has added a stake body to its one-ton truck equipment and distribution has begun through the dealer organization, it is announced.

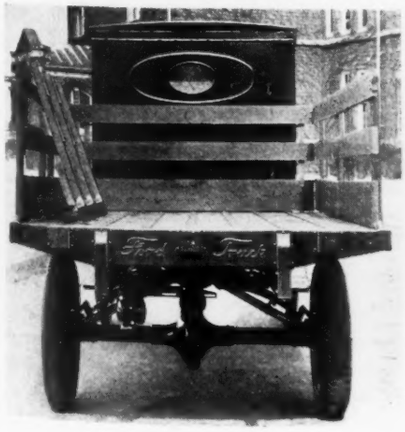
Introduction of the stake body follows that of the popular all steel cab and body brought out some time ago for which there has been a constantly increasing demand.

The new body meets many commercial requirements and is designed for carrying farm produce, raw materials, manufactured articles and bulky material in general.

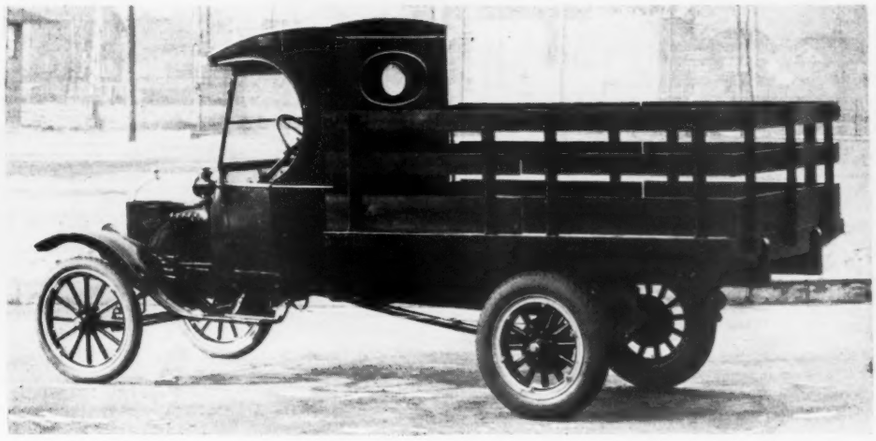
The body may be used in combination with the all-steel cab. Stakes, which are easily removable, permit a platform truck of good proportions.

Except for floor and rack boards, which are constructed from especially seasoned wood, the body is all steel. The floor space is five feet wide and eight feet, two inches long, sides rise twenty-six inches above the floor.

Racks are in five sections, two on either side and one at the rear. The sections are held together with sturdy steel stakes, ends of which fit snugly into sockets cut into the outer steel frame of the platform. Special connections hold the sections into a rigid body of exceptional strength and durability.



Rear of new Ford truck



New stake body for Ford truck for general utility use

News of All the Industry

Incorporations

Vancouver Sand and Stone Co., Ltd., Vancouver, B. C., capital $250,000.

Star Sand Co., Portland, Ore., has increased its capital stock to $500,000.

Trudeau Sand and Gravel Co., Toledo, Ohio, $10,000, by Samuel and Goldie Trudeau.

Piqua Washed Sand and Gravel Co., Piqua, Ohio, capital $50,000, by Edward F. Beckert.

Union Sand and Gravel Co., Huntington, W. Va., increased its stock from $200,000 to $500,000.

Alpha Concrete Products Co. has established a concrete block plant at 3835 Orchard avenue, Indianapolis, Ind.

Consolidated Block and Tile Co., Miami, Fla., capital stock of $100,000, by Cecil B. Seay, A. Rex Daniels and others.

C. G. Brandt and Charles E. Hollerbaugh, both of Columbus, Ohio, will establish a stucco manufacturing plant in Winter Haven, Fla.

R. L. Tucker and W. R. Knight have engaged in business at the foot of East Madison street, Portland, Ore., as the Stone Tile Co.

Hillsborough Sand and Shell Co., Tampa, Fla., capital $60,000, by F. M. Hendry, president, 1336 Northeast First street, and C. W. Phelps.

Independent Concrete Pipe Co., Indianapolis, Ind.; increased capital stock from $100,000 to $156,000, said increase being preferred stock.

Wakefield Concrete Block Co., Wakefield, Mass., 200 shares $50 each; president, Wm. A. Hickey, 26 Steadman street; treasurer, Leo A. Rogers.

Columbus Concrete Products Works, Columbus, Texas, capital stock $7000. Incorporators, L. E. Paulsen, George Becker and H. A. Spindler.

New Braunfels Lime Co., New Braunfels, Texas, has filed an amendment to their charter increasing the capital stock from $50,000 to $67,000.

Kline Brothers Concrete Products Co., Highland, Ind., capital $20,000. Directors are Clarence, Walter and Roy Kline, Henry and Samuel Van Til.

Wyeth Stone Co., Savannah, Mo., capital $12,000, by C. A. Wright of Rosedale, Mo., and W. D. Hoare. (Attorney, J. W. Roberts, Savannah.)

Tombigbee Sand and Gravel Co., Armory, Miss., capital $30,000, by J. T. Sanford, H. M. Beard, Gus E. Hansent of Columbus, La., and L. E. Puckett of Armory.

Grant Road Quarry Co., St. Louis, Mo., $20,000, by F. C. Stolle and J. L. Hemp. (Attorneys, Jones, Hocker, Sullivan and Angert, 705 Olive street, St. Louis.)

Argus Products Co., Salem, Ore., capital stock of $100,000, by R. J. Whitmore, Chas. R. Spackman, Jr., and Robert Rankin, to deal in sand, clay, cement and brick.

Toledo Cast and Artificial Stone Co., Toledo, Ohio, with a nominal capital of $500, by E. L. Kreugar, president, and Herman A. Kreugar, of the Toledo Cut Stone Co.

H. V. Concrete Products Corporation, Albany, N. Y., 1000 shares at $100 each, 1000 common, no par. Incorporators: H. A. Dwight, E. T. Moon and F. R. Scherer. (Attorney, H. Lundy, Albany.)

E. C. Williams and S. Van Brown of Williamsport, Tenn., have purchased the South Williamsport foundry building and will remodel it and convert it into concrete block plant using cinder aggregate.

Ottawa Silica Molding Co., 105 South La Salle street, Chicago, 1000 shares of no par value, by Edmon W. Pottle, Voyle C. Johnson, William B. Gilmore. (Correspondent, Sherman M. Booth, 1904 Borland Bldg.)

Freeland Stone Co., Sellersburg, Ind., has changed its name to Davis-Freeland Stone Co. Owners and operators of the stone crushing plant are now Myron H. Freeland and George B. Davis, both of Greensburg, Ind.

Prairie Sand and Gravel Co., Prairie du Chien, Wis., capital $25,000, by C. H. and Elizabeth Knight and L. D. Smith, all of Waupaca, Wis. Produce and deal in sand and gravel, crushed stone and cement products.

Pleasant Valley Lime Co., Thornton community, near Berryville, Ark. The company has ordered a crusher and will begin operations on the E. O. Parker farms near Berryville to produce limestone for agricultural purposes.

Avalon Concrete Brick, Block and Products Co., 505 West Redwood street, Baltimore, Md., capital $25,000, by H. L. Thomas, president, and Adam F. Beautro. Has plans for plant working 100 tons of washed sand into blocks daily.

Calumet Builders Supply Co., 19 South La Salle street, Chicago, capital $100,000; will operate sand and gravel pits. Incorporated by Arthur E. Hales, Theodore Stegner, Dewitt Cleland. (Correspondent, Cleland, Lee and Phelp, suite 806 Ashland block, 155 North Clark street.)

Concrete Pipe and Products Corporation, Richmond, Va., capital $150,000, by Jack M. Parrish, president, American National Bank Bldg.; Landon R. Mason, secretary. Company has first unit of plant under construction and will manufacture sewer, conduit and highway drainage pipe; daily capacity 2000 ft. of pipe 6 to 24 in. diameter.

Mactile Machine Co., Inc., Queens, Long Island, N. Y., manufacture cement products, capital 250 shares preferred stock at $100 per share and 600 shares common, no par. Directors are: James S. Linehan, 216 Hollis avenue, Queens; Thomas Gerns, Jamaica; John J. Murphy, Springfield. (Attorney, G. A. Nagle, Jamaica, Long Island.)

Quarries

C. and J. Camp Co. will build a crushed stone plant at Brooksville, Fla., with a capacity of 1000 tons per 10-hour day.

Rockport Stone Co., Rockport, Ohio, has purchased a new $4000 oil engine which it is installing preparatory to opening the season.

William J. Hays has installed a new crusher, enlarging the capacity of his plant at North Wyomissing Heights, Penn., to 300 tons daily.

The Western Lime and Cement Co.'s superintendents and foremen met in Milwaukee, Wis., recently and exchanged ideas on quarry operations.

W. W. Boxley and Co., Roanoke, Va., made its annual quarry blast at its Pounding Mill, Va., quarry recently, firing 36 holes, and using over $15,000 worth of explosives.

A rock crushing plant, with several electrically driven crushers, is being installed on a gravel bar on the Upper Willamette river, four miles below Oakridge, Ore., to produce ballast material for the Klamath Falls-Eugene line of the Southern Pacific R. R. between Oakridge and Springfield.

Reliable Rock Crushing Co.'s plant near Azusa, Calif., seems to be the object of an attempt at sabotage; at least two deputy sheriffs have been detailed to investigate the placing of several sticks of dynamite in such a way as to indicate an attempt to blow up the plant. The plant is valued at $750,000, according to Superintendent R. B. Vaughn in a local paper, and machinery has been tampered with on several occasions and rock bins have been opened and contents spilled.

Cement

Virginia Portland Cement Co., South Norfolk, Va., will spend approximately $1,450,000 to complete and start a plant there; daily capacity 12,000 bags of cement.

International Portland Cement Co., Ltd., Spokane, Wash., was given an order for 2600 bbl. of cement by the city of Spokane at $3.18 per barrel, less 40 cents per barrel for return of sacks and 10 cents per barrel for cash.

Birmingham Slag Co., Birmingham, Ala., was host to about 70 architects, building contractors and supply men of the Birmingham district at a banquet recently. A. J. R. Curtis, manager of the Cement Products Bureau of the Portland Cement Association, was the principal speaker.

Alpha Portland Cement Co., Jamesville, N. Y., was awarded the contract to furnish 45,000 bbl. of cement to Onondago county delivered at Jamesville at $2.56 per barrel. Under the terms of the contract the county has an option of increasing its order to 67,500 bbl. at the same price. The bids were advertised twice, no mill prices being submitted the first time and the lowest dealer's bid being $2.66.

Sand and Gravel

National Holdings, Ltd., Vancouver, B. C., has offered to purchase the city's gravel pit at Coquitlam for $100,000, to be paid in royalty of 60 cents per yard of gravel removed.

H. D. Conkey and Co., Mendota, Ill., will build a $100,000 washed gravel plant at North Aurora, Ill., according to local papers. The plant will have a capacity of 50 cars a day and be ready for operation by August 1.

Ralph Bowsman is installing a gravel washing plant at his pit near Piqua, Ohio. Electric power will be used and the plant will be in operation in a few weeks. He also expects to use a fleet of motor trucks for deliveries.

Richmond-Greenville Gravel Co. and the Preble county (Ind.) board of commissioners will jointly finance the construction of an unloading apparatus beneath the traction viaduct, about 1½ miles out of Eaton, Ind., on the Eaton-Richmond pike, to better facilitate the handling of sand and gravel in the county.

An ordinance prohibiting the taking of sand, stone, gravel or earth from the lake shore between the north limits of Racine, Wis., and the Root river has been introduced in the common council of Racine by Alderman Harry Miller. The ordinance provides the protection of the beach to be effective to a distance of 150 ft. from the water.

Missouri Gravel Co., La Grange, Mo., whose incorporation was announced in the March 21 issue of Rock Products, is the Moline Consumers Co. subsidiary that is to build the new sand and gravel plant at La Grange. The officers of this company are those of the Moline company, James P. Pearson, president; E. H. Wilson, first vice-president; G. A. Shallberg, second vice-president; Charles C. Loptien, secretary, and Oscar W. Ellis, treasurer, all of Moline, Ill. Oscar Johnson is in charge of construction of the plant, which will have a capacity of 600,000 tons annually.

Cement Products

Ideal Cement Works, Grand Island, Neb., has added equipment at its plant to manufacture Duntile. Alfred L. Mader is the owner of the cement products plant.

Merced Concrete Pipe Co., Merced, Calif., of which B. J. Urkopina is general manager, will establish a plant in Woodland, Calif., to manufacture concrete pipe, the plant to cost about $10,000.

Concrete Pipe Co., New Orleans, La., has received an order for 150 carloads of concrete pipe for surface drainage from the city of Mobile, Ala. The plant is at 2200 Eurhrosine street and Mr. Newell is manager.

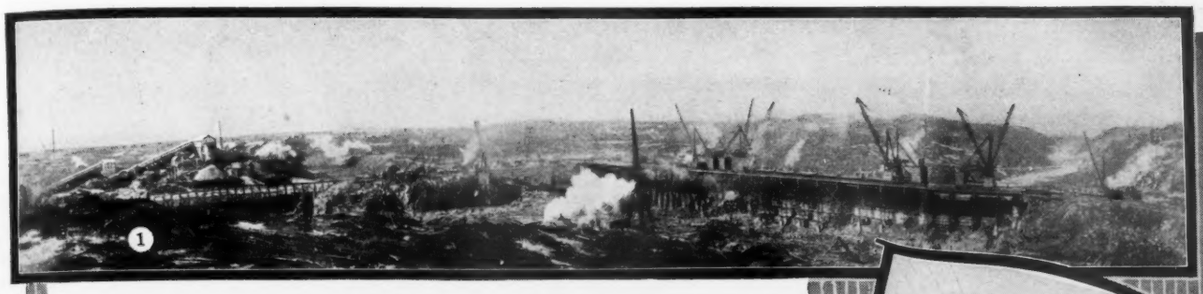
L. M. Jackson, Middletown, Penn., has erected a concrete products plant with a capacity of 400 blocks per day. The plant has a floor space of 20 by 100 ft. and is known as the "Universal Concrete Products Plant."

Acme Concrete Products and Gravel Co., Cement City, Mich., has placed an order with the Anchor Concrete Machinery Co. of Adrian, Mich., for new tile making, conveying and loading machinery. The installation of this equipment will be made in about two weeks and will increase the capacity of the plant by 1000 tile daily, giving the company a total output of about 7000.

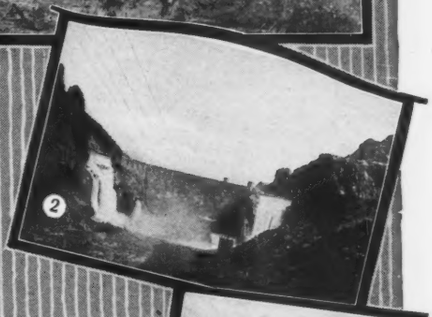
Cement Products and Supply Co., Toledo, Ohio, G. R. Huntley, proprietor, has erected a new plant in West Toledo with the latest type machinery. The plant has a capacity of 1800 blocks per day. Mr. Huntley plans to construct overhead sand bins and install conveying equipment soon. He also plans to erect another building to serve as a warehouse for plaster and other materials.

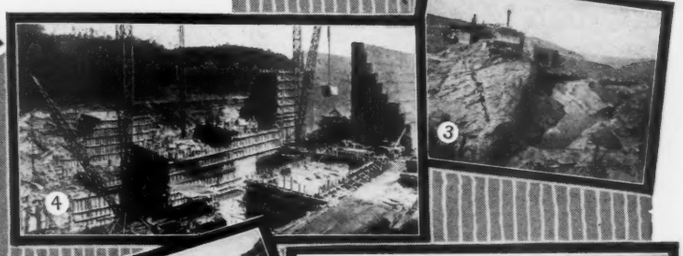
Lime

Reliance Whiting Co., Alton, Ill., is installing a new mill for making water floated whiting and will start operating about June 1.



Some Notable Achievements of Engineering History





Large Dams, Irrigation Projects, etc.

In which Allis-Chalmers Engineering Service and Equipment have been Important Factors

1. Quebec Development Co., Isle Maligne Development. Complete rock crushing plant. Allis-Chalmers hydraulic turbines developing 540,000 H. P. are also being installed.
2. Roosevelt Dam, Elephant Butte, Arizona. Complete cement plant.
3. Ebro Dam, Barcelona, Spain. Crushing and cement plant.
4. Locks and Dam No. 17, Black Warrior River, Alabama, U. S. Government. Complete crushing plant.
5. Barberine Dam — Switzerland. Crushing, washing and screening plant.
6. Naval Dry Docks, Toulon, France. French Government. Crushing plant complete with motor drive.

7-8. Cheoah and Badin Dams and power plants, Yadkin River. Tallassee Power Co. In addition to the crushing plants used in construction, Allis-Chalmers hydro-electric units are installed in power plants.

9-10. Southern California Edison Co. Allis-Chalmers crushing equipment used in the construction of five large development projects as well as hydraulic and electrical machinery in several power plants.

11. Reservoir Dams, Government of Brazil. Rock crushing and cement grinding plants.

Arrow Rock Dam, near Boise, Idaho.
Panama Canal, Panama. Crushing plant at Colon.
Wilson Dam, Muscle Shoals, Tennessee River.
Lookout Shoals Development, near Catawba, N. C. Southern Power Co.
Tallulah Falls, Tallulah, Georgia. Georgia Railway and Power Co.
Goat Rock Development, Chattahoochee River, near Columbus, Ga. Columbus Power Co.

Let Allis-Chalmers Engineers Serve You.

ALLIS-CHALMERS

MILWAUKEE, WIS. U.S.A.

When writing advertisers, please mention ROCK PRODUCTS

Coleman Brick and Lime Co., Santa Barbara, Calif., is about to begin erection of a $3600 warehouse at 310 North Salispuedes street.

United States Gypsum Co. recently started 75 union workers on the erection of the steel structure at the lime plant under construction at Cordova, Ill., according to a Davenport, Iowa, newspaper. About 200 men are being used in the whole plant construction. A 15,000 v. power line is being erected from East Moline to the plant at a cost of $25,000.

Silica Sand

Ottawa Silica Sand Co., Ottawa, Ill., has purchased 39 acres of sand land at Ottawa from Edward Swift, according to an announcement by Philip McDougall, general manager, in a local paper. The consideration was said to be $1000 per acre. The property will be held in reserve for the present.

Gypsum

Blue Diamond Co., 2200 East 16th street, Los Angeles, Calif., has purchased a large acreage of gypsum land in Clark county, Nevada, near Las Vegas, and will construct an aerial tramway 3000 ft. long and make other improvements.

Feldspar

Maine Milling and Mining Co., Portland, Me., plan to construct a feldspar grinding plant with a capacity of 40 to 50 tons per day at West Paris, Maine. Electric power will be used.

Potash

Eastern Potash Corporation, Raritan, N. J., has been confirmed a bankrupt in the United States District Court at Philadelphia, Penn. Under the terms of the confirmation the creditors are to receive 6% of the debenture stock of the Building Material Co., which will take over the property. A few preferred accounts, amounting to $1000, are to be paid in cash.

Magnesite

El Mirador Magnesite Co. has resumed work in its magnesite mine east of Strathmore, in Tulare county, California. The plant will employ between 20 and 30 men.

Manufacturers

Lincoln Electric Co., Cleveland, Ohio, has developed an electric motor in which steel is used in its construction instead of cast iron. The development is said to have been made possible through the use of welding and other patented devices. The motor is lighter and is claimed to withstand considerable abuse.

Foote Bros. Gear and Machine Co., Chicago, at its annual stockholders meeting, unanimously re-elected directors: J. T. Kerwin, W. C. Davis, A. W. Foote, Thos. J. Harper, Leo J. Doyle, Ralph M. Shaw, E. J. Robinson. The directors elected W. C. Davis, president; J. T. Kerwin, vice-president; A. W. Foote, secretary.

Allis-Chalmers Manufacturing Co. has made an agreement with the Edge Moor Iron Co. for the sale of the latter company's water tube boilers and waste heat systems in Europe and South America. Already two Edge Moor waste systems have been sold through the Allis-Chalmers sales organization for installation at Marseille, France and Barcelona, Spain.

Industrial Works, Bay City, Mich., announces that Lyle Marshall, former manager of the service department at Bay City and later connected with the Chicago office of the company, has been appointed district sales manager with offices at 619 Dixie Terminal Bldg., Cincinnati, Ohio. James E. Shearer, assistant sales manager at Bay City, has moved his headquarters to the company's New York oce at 50 Church street. George T. Sinks, in charge of the New York district, will remain in that position.

Personals

Sam Dolston has been named manager of the washed sand department of Graham Bros., Inc., at Long Beach, Calif. The company will render practically 24-hour delivery service in this department in the future.

W. H. Magee, field representative of the central division of the National Lime Association, gave an illustrated lecture on the use of lime in concrete and other materials at a meeting of the Brick Contractors' Association at Dayton, Ohio, on March 16.

W. George Weaver, professor of mechanical engineering at the University of Capetown, South Africa, recently wrote to the Atlas Portland Cement Co. asking for photographs of rotary kilns at the Hudson, N. Y., plant. The photograph was furnished and also a number of lantern slides of the plant.

John M. Smallshaw has been appointed salesman in the St. Louis territory for the Chain Belt

John M. Smallshaw

Co. of Milwaukee, Wis., to succeed T. F. Scannell. Mr. Smallshaw is a graduate of Purdue University and was formerly associated with the Dixie Portland Cement Co. and later with the Wolverine Portland Cement Co. More recently he has been on the engineering staff of the Chain Belt Co. and has also been connected with the company's sales organization at Milwaukee.

He will now make his headquarters at 1117 Boatman's Bank Bldg., St. Louis, Mo., and handle the company's line of "Rex" elevating and conveying equipment. The Tulley Equipment Co. will continue to be the exclusive distributors of "Rex" concrete mixers for that district.

Trade Literature

American Hoist and Derrick Co., St. Paul, Minn. have a new general catalog and a new locomotive crane catalog ready for distribution.

W. C. Lipe, Inc., Syracuse, N. Y., has a new circular on its speed reducers having a gear ratio ranges 4:1 to 200:1 in single, double and triple reductions.

De La Vergne Machine Co., New York, gives a good description of the mechnical features and operating performances of its vertical Diesel oil engines type "SI" in bulletin No. 183.

American Blower Co., Detroit, Mich., in its bulletin No. 1801, describes verbally and pictorially its various types of "Sirocco" fans and blowers. Extensive data in tabular form are included.

W. A. Jones Foundry and Machinery Co., Chicago, have just published a new general catalog No. 30 containing data on spur gear reducers, enclosed worm gear drives, friction clutches and other power transmission machinery.

Link-Belt Co., Chicago, has recently published a new book, No. 546, on skip hoists and their application, giving complete details of operation, capacity, design and construction accompanied with both drawings and photographs.

Conveyors Corporation of America, 326 West Madison street, Chicago, manufacturers of coal and ash handling equipment, have published a booklet illustrating and describing the utilization of their storage tanks for coal and ash.

Hardinge Co., York, Penn., has recently published two new bulletins, No. 18 on fine grinding with tube mills and No. 19 on grinding and mixing with Hardinge cylindrical and conical batch mills.

Jeffrey Manufacturing Co., Columbus, Ohio, has published its new catalog No. 410 on its bucket elevators. It is well illustrated with photos of installations in sand and gravel and quarry plants.

Russell Grader Mfg. Co., Minneapolis, Minn., manufacturers of road building equipment, have published a new general catalog of their various types of scrapers, plows, drag lines and other road machinery, including the Russell "Senior" screening, crushing and loading plant.

Newark Wire Cloth Co., Newark, N. J., has published a new catalog No. 25 on its line of wire cloth products, including a variety of screens and wire cloth. It is well illustrated with pictures and graphs and gives tables of information and pointers on selecting and examining wire cloth.

Blaw-Knox Co., Blawnox, Penn., has recently published two booklets on Road Building Equipment and Railroad Buckets. The first illustrates and describes the Blaw-Knox road forms, aggregate batchers, batcher plants and steel bins, the second is devoted to its clamshell buckets, illustrations and tabular data are included.

Goodman Manufacturing Co., 48th and Halsted streets, Chicago, has published book No. 250, which is an attractive volume of 56 pages on electric locomotives for industrial service. Various standard and special types of Goodman electric locomotives are briefly described and well illustrated and detailed description of features given.

Plibrico Jointless Firebrick Co., Chicago, has published a new edition of the Plibrico catalog on refractories and furnace design. Considerable information is included on the installation of monolithic furnace linings and the use of this lining for furnace fronts, arches, side walls and ovens. A section is devoted to lining furnaces under oil burning boilers.

American Manganese Steel Co., Chicago Heights, Ill., has issued a circular giving a list of most of the applications of manganese steel castings. The list is divided into 107 sub-heads and includes numerous parts in cement industry equipment, conveyors, crusher parts, sand dredge pumps and parts, track work, screens and various other sand and gravel and gypsum industries equipment. On the back page appears a questionnaire on the nature of manganese steel.

Idaho Marble Stucco and Terrazzo Plant Improved

THE Idaho Marble company with quarries and plant located on Bedrock creek 28 miles above Lewiston, is now entering the markets of the northwest with a splendid quality of marble for stucco and terrazzo finishing, chicken grits, fertilizer and white sand for white cement.

The plant has been under process of development for more than a year but it was not until recently that the full equipment was installed and the arrangements were completed for shipping. The Northern Pacific has installed a spur at the mouth of Bedrock creek to accommodate the shipments of the company and one mile of the highway from the plant to the railroad is now being surfaced, using crushed marble for surfacing material.

The plant of the company has a capacity of three carloads daily but at the present time the production is a little better than one carload. Production will be increased to meet orders on hand when rail connections are completed.

The plant is located adjacent to a mountain-side of marble and a railroad tram is used to convey the marble from the quarry to the crusher. A bucket conveyor carries the marble from the crusher into the mill where it is graded for the various purposes.